Division of Oil, Gas, and Geothermal Resources

Preliminary Assessment of Eleven Aquifers Historically Treated as Exempt July 15, 2015

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Executive Summary

The Division of Oil, Gas and Geothermal Resources has made a preliminary evaluation of whether current data support a determination that the eleven aquifers historically treated as exempt currently meet the criteria for an aquifer exemption.

The eleven aquifers historically treated as exempt, and significant relevant data for each, are as follows:

• The South Tapo Canyon field - the Pico formation (no longer being used);

Injection Wells: 0 TDS: 1,900 ppm NaCl Depth: 0- 1,000'

• The Blackwell's Corner field - The Tumey formation (no longer being used);

Injection Wells: 0 TDS: 2,100 -2,600 mg/l Depth: 945' - 1,473'

• The **Kern Bluff** field – the **Kern River** formation (no longer being used);

Injection Wells: 0 TDS: 400 – 900 mg/l Depth: 0- 200'

• The **Kern Front** field – the **Santa Margarita** formation;

Injection Wells: 13 TDS: 460 – 2,318 mg/l Depth: 2,197' – 2,840'

• The Kern River field -the Chanac formation;

Injection Wells: 12 TDS: 926 – 3,325 mg/l Depth: 425' – 1,335'

• The Kern River field – the Santa Margarita formation;

Injection Wells: 32 TDS: 490 – 1,584 mg/l Depth: 760' – 2,285'

• The **Mount Poso** field – the **Walker** formation;

Injection Wells: 5 TDS: 1,069 mg/l Depth: 1,740' – 1,796'

• The **Round Mountain** field – the **Olcese** formation;

Injection Wells: 6 TDS: 2,693 mg/l Depth: 710' – 850'

• The Round Mountain field - the Walker formation;

Injection Wells: 30 TDS: 2,335 mg/l Depth: 1,890' – 2,590'

• The **Bunker Gas** field - **all aquifers** within the field that are not in a hydrocarbon producing zone (no longer being used);

Injection Wells: 0 TDS: 1,215 mg/l Depth: 3,000'

• The **Wild Goose** field - **All aquifers** within the field that are not in a hydrocarbon producing zone (no longer being used);

Injection Wells: 0 TDS: 2,800 -5,000* mg/l Depth: 2,700' - 3,400'

*More recent analysis indicate TDS around 24,000 mg/l

Key portions of the above data, in spreadsheet form:

				quifers Snapshot		
Field	Formation	Number of Active Injection Wells	Total Dissolved Solids of Formation	Total Disolved Solids of Injected Fluid	Depth	Historic Volumes Injected Since 1983 Barrels
South Tapo Canyon	Pico	0	1,900 ppm NaCl	600 ppm NaCl	1,000'	0
Blackwell's Corner	Tumey	0	2,100 - 2,600 mg/l	29,000 ppm NaCl	945' - 1,475'	2,425
Kern Bluff	Kern River	0	400 - 900 mg/l	600 mg/l	200	5,816,190
Kern Front	Santa Margarita	13	460 - 2,318 mg/l	360 - 6,400 mg/l	2,197' - 2,840'	151,820,215
Kern River	Chanac	12	926 -3,325 mg/l	491 - 2,000 mg/l	425' - 1,335'	568,987,463
Kern River	Santa Margarita	32	490 - 1,584 mg/l	491 -74,924 mg/l	760' - 2,285'	799,041,272
Mount Poso	Walker	5	1,069 mg/l	650 mg/l	1,740' - 1,796'	63,777,556
Round Moutain	Olcese	6	2,693 mg/l	1,900 mg/l	710' - 850'	160,798,008
Round Mountain	Walker	30	2,335 mg/l	1,600 - 2,900 mg/l	1,890' - 2,590'	1,529,910,014
Bunker	Undifferentiated	0	1,215 mg/l	10,675 - 11,025 ppm Chloride	3,000'	51,454
Wild Goose	Undifferentiated	0	24,349 mg/l	24,349 mg/l	2,700' - 3,400'	0

Division of Oil, Gas, and Geothermal Resources

Preliminary Assessment of Eleven Aquifers Historically Treated as Exempt July 15, 2015

The US EPA, State Water Board, and the Division have agreed that the State will submit an evaluation of each of the 11 Historically Treated as Exempt (HTAE) aquifers with a preliminary assessment as to whether current data would support a determination that the criteria for an aquifer exemption are met.

11 HTAE aguifers historically treated as exempt are as follows:

- The **Pico** formation within the boundaries of the **South Tapo Canyon** field (no longer being used);
- The **Tumey** formation within the boundaries of the **Blackwell's Corner** field (no longer being used);
- The Kern River formation within the boundaries of the Kern Bluff field;
- The Santa Margarita formation within the boundaries of the Kern Front field;
- The **Chanac** formation within the boundaries of the **Kern River** field;
- The **Santa Margarita** formation within the boundaries of the **Kern River** field;
- The Walker formation within the boundaries of the Mount Poso field;
- The Olcese formation within the boundaries of the Round Mountain field;
- The Walker formation within the boundaries of the Round Mountain field:
- All aquifers within the Bunker Gas field that are not in a hydrocarbon producing zone and that have groundwater that has less than 10,000 TDS (no longer being used); and
- All aquifers within the Wild Goose field that are not in a hydrocarbon producing zone and that have groundwater that has less than 10,000 TDS (no longer being used).

More detail on each aguifer is set out below.

South Tapo Canyon Field, Pico Zone, Ventura District

1) Number of disposal wells permitted in the zone:

2) Number of active producers:

n

3) Depth of the zone across the field:

At the surface on the south side of the field to 1,000 ' below surface depth on the north side. There are opposing thrust faults therefore, there is a wide range in zone depth across the field. Zone dips to the north across the field. This is based on the data sheet.

4) Volumes Injected Historically since 1983:

None. District confirmed that there is no documentation that injection ever historically occurred in the Pico zone. The 5/17/1985 EPA letter contradicts this and indicates that injection did occur starting in 1948 and 1,903,000 Bbls was historically injected in this zone.

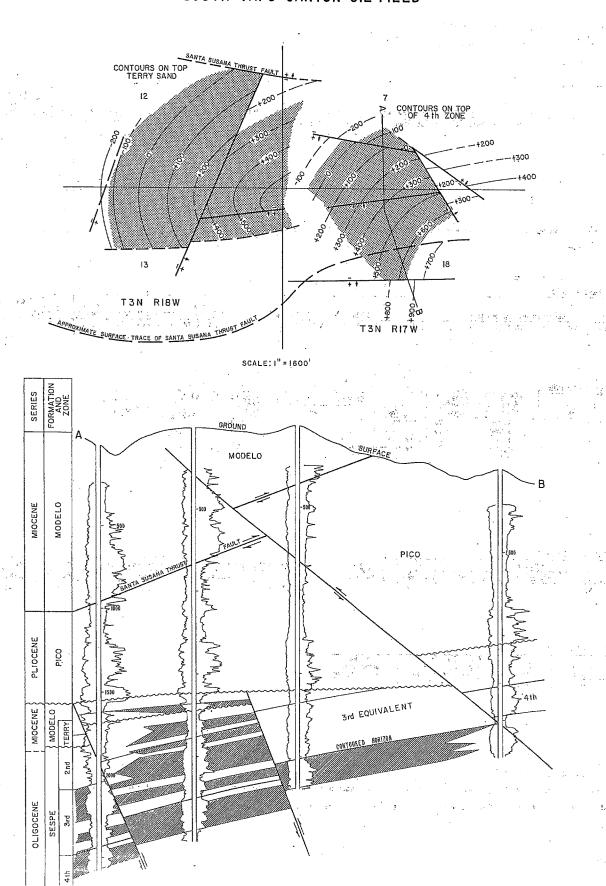
5) TDS of zone:

1,900 ppm NaCl according to 5/17/1985 EPA letter

6) TDS of injection water:

600 ppm NaCl according to the 5/17/1985 EPA letter

SOUTH TAPO CANYON OIL FIELD



Attachment 1, Preliminary Assessment of 11 Aquifers Historically Treated As Exempt

Page 6

LOCATION: 32 miles northeasterly of Ventura

TYPE OF TRAP: Faulted anticline

ELEVATION: 2,440

DISCOVERY DATA

Zone	Present operator and well name	Original operator and well name	Sec. T. & R.	B & M	produ	daily action Gas (Mcf)	Date of completion
Terry 2nd Sespe	Crown Central Petroleum Corp. "Tapo" 2 Union Oil Co. of Calif. "South Tapo- Gillibrand" 11-7	Torry and Jensen "Tapo" 2 Union Oil Co. of Calif. "Simi" 11-7	13 3N 18W 7 3N 18W	SB SB	720 99	100 411	Feb 1953 Jul 1954
3rd Sespe 4th Sespe	Same as above Same as above	Same as above Same as above	7 3N 18W 7 3N 18W	SB SB	*	*	Jul 1954 Jul 1954
	7 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1						

Remarks: * Initial production from the 2nd, 3rd and 4th Sespe zones was commingled.

DEEPEST WELL DATA

e de la companya della companya della companya de la companya della companya dell	5 6	Date	_		Depth	At total o	lepth
Present operator and well name	Original operator and well name	started	Sec. T. & R.	8 & M	(feet)	Strata	Age
Havenstrite Oil Co. "Tapo" 1	Same	Jan 1949	13 3N 18W	SB	8,394	Llajas	Eocene

PRODUCING ZONES

11	Average Average net thickness		1,1	Geologic	Oil gravity	Salinity of	Class BOPE
Zone	(feet)	(feet):	Age	(°API) or zone water Formation Gas (btu) gr/gal			required
Terry 2nd Sespe 3rd Sespe 4th Sespe	2,200 1,800 1,880 2,200	60 70 220 180	Miocene Oligocene Oligocene Oligocene	Modelo Sespe Sespe Sespe	32 18 18 18 18		II II II
		•	100				

PRODUCTION DATA (Jan. 1, 1974)

		,									
	1973 Production	,	1973 Proved	1973 Average number	Cumulative	production	Peak oil prod	uction	Total num	ber of wells	Maximum
Oll (bb1)	Net gas (Mcf)	Water (bbl)	acreage	producing wells.	Oil (bbl)	Gas (Mcf)	Barrels	Year	Drilled	Completed	proved acreage
40,260	,509	140,374	210 /	. 14	4,332,509	1,905,031	905,009	1953	50	. 35	240

STIMULATION DATA (Jan. 1, 1974)

Type of project	Date Started	Cumulative Injection - Water, bbl; Gas, Mcf; Steam, bbl (water equivalent)	Maximum number of wells used for injection
	; ;	•	
			:

SPACING ACT: Applies

BASE OF FRESH WATER: None

CURRENT CASING PROGRAM: 11 3/4" cem. 100; 7" combination string landed through zone and cemented through ports above zone.

METHOD OF WASTE DISPOSAL: All waste water is injected into a water-disposal well.

REMARKS: * Terry zone water is high in bicarbonates and total dissolved solids. A cyclic-steam project was started in 1964 and was discontinued in 1965 after the injection of 11,063 bbls. of water (in the form of steam).

REFERENCES: Hardoin, J.L., South Tapo Canyon Oil Field, Calif. Div. of Oil and Gas, Summary of Operations -- Calif. Oil Fields, Vol. 44, No. 1 (1958).

Blackwell's Corner Field, Tumey Zone, Bakersfield District office

1) Number of disposal wells permitted in the zone:

0

2) Number of active producers:

0

3) Depth of the zone across the field:

945' to 1,473' below surface depth. Zone dips significantly to the Southeast across the field. Zone truncated by angular unconformity about $\frac{1}{2}$ mile northwest of field.

4) Volumes injected historically since 1983:

2,425 Bbls, last injected on 5/1/1986

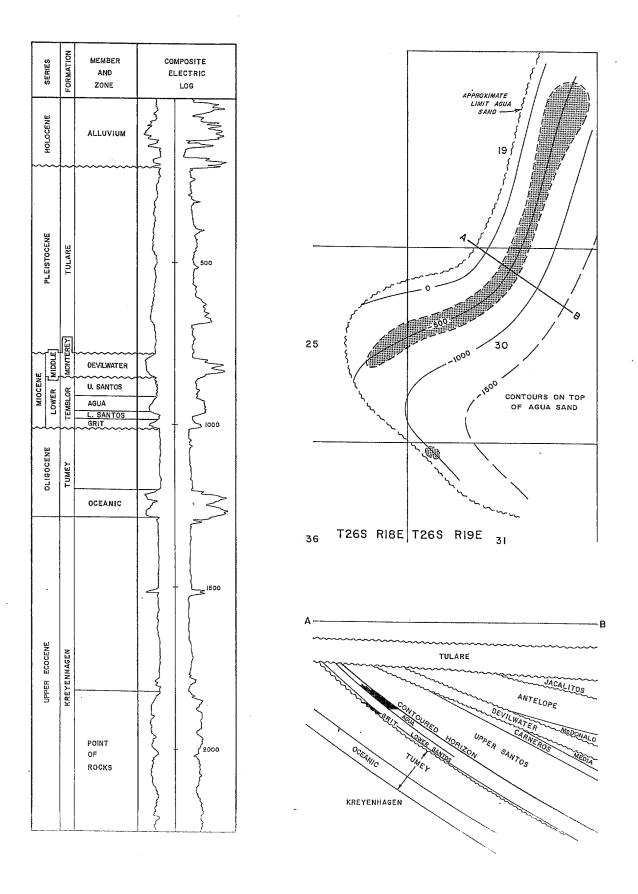
5) TDS of zone:

Prior to injection 2,100 - 2,600 mg/l TDS (calculated) according to the 5/17/1985 EPA letter

6) TDS of injection water:

29,000 ppm NaCl according to the 5/17/1985 EPA letter

BLACKWELLS CORNER OIL FIELD



Attachment 1, Preliminary Assessment of 11 Aquifers Historically Treated As Exempt

Kern County

LOCATION: 45 miles northwest of Taft

TYPE OF TRAP: Permeability barrier on an anticlinal nose

ELEVATION: 700

DISCOVERY DATA

						l daily uction	
Zone	Present operator and well name	Original operator and well name	Sec. T. & R.			Gas (Mcf)	Date of completion
Devilwater Agua Grit	General Crude Oil Co. Oper. "Occidental" 10 General Crude Oil Co. Oper. "Occidental" 3 General Crude Oil Co. Oper. "Occidental" 5	Etienne Lang "Occidental" 10-N.W. 30 Etienne Lang "Occidental" 3-N.W. 30 Etienne Lang "Occidental" 5-N.W. 30	30 268 19E 30 268 19E 30 268 19E	MD	20 50 30	N.A. N.A. N.A.	Jun 1944 Dec 1943 Aug 1944

Remarks:

DEEPEST WELL DATA At total depth Date Sec. T. & R. B & M Age Present operator and well name Original operator and well name Jul 1954 30 26S 19E MD 3,224 Tumey Oligocene The Superior Oil Co. "O.L.C." 7 Same

	Average	Average net thickness	G	eologic	Oll gravity (*API) or	Salinity of zone water	Class BOPE
Zone	depth (feet)	(feet)	Age	Formation	Gas (btu)	gr/gal	required
)evilwater Agua Grit	700 1,300 1,400	25 85 5	middle Miocene early Miocene early Miocene	Temblor Temblor Temblor	13 14 14	N.A. 790 790	None None None

PRODUCTION DATA (Jan. 1, 1973) 1972 Average number producing wells 1972 Proved acreage Cumulative production Peak oli production Total number of wells 1972 Production Drilled Completed Gas (Mcf) 90,521 Barrels OII (bbI) Net gas (Mcf) Water (bbl) Oil (bbl) 813,907 240 15,659

STIMULATION DATA (Jan. 1, 1973)

Type of project	Date started	Cumulative Injection - Water, bbl; Gas, Mcf; Steam, bbl (water equivalent)	Maximum number of wells used for injection

SPACING ACT: Applies

BASE OF FRESH WATER: None

CURRENT CASING PROGRAM: 7" cem. above zone; 5 1/2" liner landed through zone.

METHOD OF WASTE DISPOSAL: Evaporation and percolation sumps.

REMARKS: Formerly known as Shale Hills Area.

REFERENCES: Karmetich, F.J., Blackwells Corner Oil Field: Calif. Div. of Oil and Gas, Summary of Operations -- Calif. Oil Fields, Vol. 37, No. 2 (1951).

Kern Bluff Field, Kern River Zone, Bakersfield District, East Side

Number of disposal wells permitted in the zone:

2) Number of active producers:

n

3) Depth of the zone across the field:

Surface depth. Former WD well (API #02908849) uppermost perf is at 200' depth.

4) Volumes injected historically since 1983:

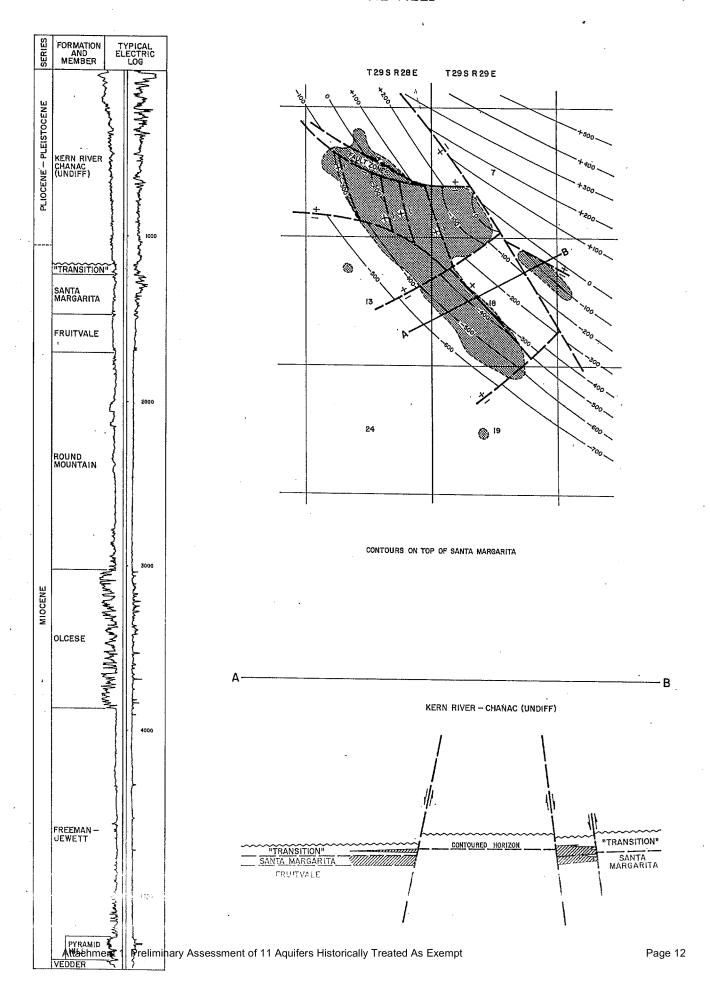
5,816,190 Bbls, last injected on 6/1/1993

5) TDS of zone:

400 - 900 mg/l according to the 5/17/1985 EPA letter

6) TDS of injection water:

600 mg/l according to 5/17/1985 EPA letter



Kern County

LOCATION: 6 miles northeast of Bakersfield

TYPE OF TRAP: Faulted homocline

ELEVATION: 800

DISCOVERY DATA

					Initial daily production			
Zone	Present operator and well name	Original operator and well name	Sec. T. & R.	B & M	Oli (bbl)	Gas (Mcf)	Date of completion	
Transition Santa Margarita	Shell Oil Co. "Afana" 1 Gulf Oil Corp. "Needham-Bloemer" 15	Same as present Oceanic Oil Co. "Needham-Bloemer" 1	18 298 29E 7 295 29E		18 90	N.A.	Feb 1944 Sep 1947	

Remarks:

DEEPEST WELL DATA

	Date			Depth	At total depth		
Present operator and well name	Original operator and well name	started	Sec. T. & R.	8 & M		Strata	Age
Kernview Cil Co. "Muir" 13	Gene Reid Exploration Co. "Muir" 13	Feb 1949	18 29S 29E	MD	5,425	Vedder	early Mio

PRODUCING ZONES

	Average	Average net thickness		Geologic	Oil gravity (°API) or	Salinity of zone water	Class BOPE
Zone	depth (feet)	(feet)	Age	Formation	Gas (btu)	gr/gal	required
Transition	740 - 1,350	30 - 80	late Miocene	Transition	14	5	None
Santa Margarita	950	55	late Miocene	Santa Margarita	14	5	None
				:			
	1						

PRODUCTION DATA (Jan. 1, 1973)

PRODUCTION D	ATA ()an. 1, 19/2))									
1972 Production			1972	1972 Average number	Cumulative	Peak oll prod	uction	Total num	Maximum proved		
Oll (bbl)	Net gas (Mcf)	Water (bbl)	Proved acreage	producing wells	Off (bbi)	Gas (Mcf)	Barrels	Year	Drilled	Completed	acreage
216,477	0	3,365,718	670	131	9,410,522	0	845,373	1949	214.	166	690

STIMULATION DATA (Jan. I, 1973)

Type of project	Date started	Cumulative injection - Water, bbl; Gas, Mcf; Steam, bbl (water equivalent)	Maximum number of wells used for injection
Cyclic-steam	1965	3,701,855	124
·			
	1		

SPACING ACT: Applies

BASE OF FRESH WATER: 950

CURRENT CASING PROGRAM: 8 5/8" cem. above zone and across base of fresh-water sands; 6 5/8" liner landed through zone.

METHOD OF WASTE DISPOSAL: Waste water is injected in disposal wells (808,148 bbls. in 1972), steam injection wells, and in unlined sumps where water quality meets Div. of Oil and Gas standards. REMARKS:

REFERENCES: Corwin, C.H., Fern Fluff Cll Field: Calif. Div. of Oil and Gos, Summery of Operations--Calif. Oil Fields, Vol. 36, No. 1 (1980).

Kern Front Field, Santa Margarita Zone, East Side Bakersfield District

1) Number of disposal wells permitted in the zone: 13

2) Number of active producers:

0

3) Depth of the zone where the injection wells are located:

2,197' to 2,840' below surface

4) Volumes injected historically since 1983:

151,820,215 Bbls injected, last injected on 3/1/2015

5) TDS of zone:

460 mg/l - 2,318 mg/l TDS

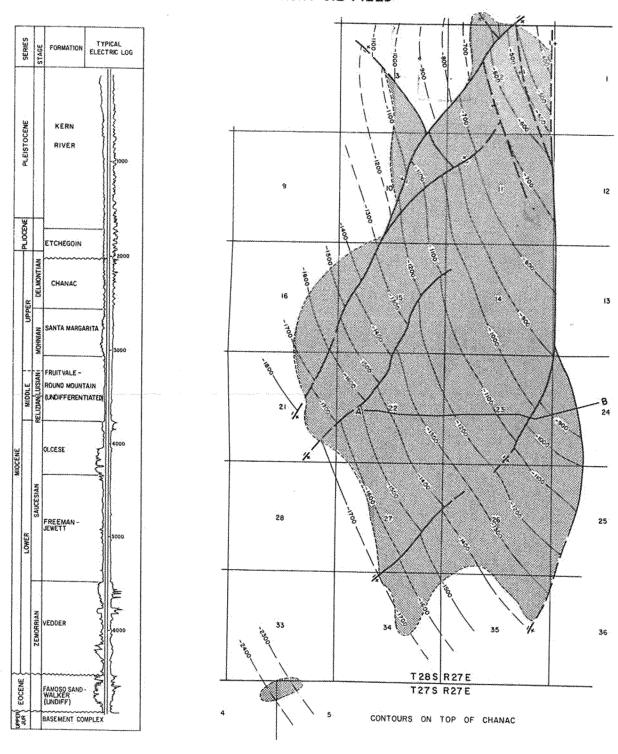
The 460 mg/l TDS sample is from the lower Santa Margarita zone in 4-4W well (029-62979) collected at a depth between 3,425'-3,255' on 12/9/1988 and the 2,318 mg/l TDS sample is from WD#1 (029-54754) well at a depth of 2,300' on 9/17/1975.

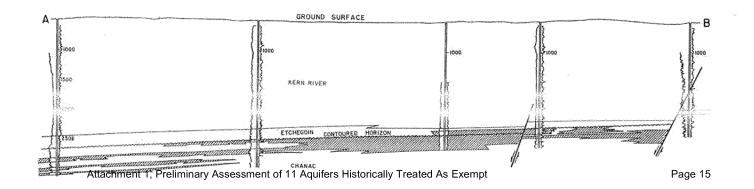
6) TDS of injection water:

360 mg/l - 880 mg/l and 6,400 mg/l TDS.

The 360mg/I TDS sample is from "injection wells "Movius" 3, 2 and D11 on 8/27/2010, the 880 mg/I TDS sample is from well Sec. 27 waste water to "Valley Waste KFF" on 11/2/1997 and the 6,400 mg/I TDS sample is the only high concentration sample collected from "waste water at injection well" on 4/11/2011. The 6,400 mg/I TDS sample is from project #33800012 and is most likely from the cogeneration and scrubber brine waste water. The permitted injection fluids in the Kern Front field, Santa Margarita zone consists of produced water from the Chanac, Etchegoin and Santa Margarita zones and cogeneration and scrubber brines from a plant.

KERN FRONT OIL FIELD





LOCATION: 5 miles northwest of Bakersfield

TYPE OF TRAP: Permeability variations on a faulted homocline

ELEVATION: 750

DISCOVERY DATA

						Initia prod	il daily uction	
Zone	Present operator and well name	Original operator and well name	Sec.	T. & R.	B & M	OII (bbl)	Gas (Mcf)	Date of completion
Etchegoin	Standard Oil Co. of Calif. No. 1	Same as present		8S 27E		10	N.A.	1912
Chanac	Standard Oil Co. of Calif. No. 1	Same as present	27 2	85 27E	MD	190	N.A.	Aug 1914
					1			
					l			
	·						l	
							1	
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Remarks:

DEEPEST WELL DATA

		Date			Depth	At total d	epth
Present operator and well name	Original operator and well name	started	Sec. T. & R.	B & M		Strata	Age
Atlantic Richfield Co. "Kramer" 1	Richfield Oil Corp. "Kramer" 1	Sep 1941	34 28S 27E	MD	7,738	Basement (slate)	Late Jur

PRODUCING ZONES

	Average depth	Average net thickness	,	Geologic	Oil gravity (*API) or	Salinity of zone water	·Class BOPE
Zone	(feet)	(feet)	Age	Formation	Gas (btu)	gr/gal	required
Etchegoin Chanac	2,265 2,320	70 250	Pliocene late Miocene	Etchegoin Chanac	14 15	N.A. 5	None None

PRODUCTION DATA (Jan. 1, 1973)

-	1972 Production		1972 Proved	1972 Average number	Cumulative	Peak oil prod	uction	Total number of wells		Maximum proved	
Oll (bbl)	Net gas (Mcf)	Water (bb1)	acreage	producing wells	Oil (bb1)	Gas (Mcf)	Barrels	Year	Drilled	Completed	acreage
3,148,559	293,008	25,578,898	5,000	852	128,591,808	14,667,840	4,535,059	1929	1,322	1,206	5,055

STIMULATION DATA (Jan. 1, 1973)

Type of project	Date started	Cumulative injection - Water, bbl; Gas, Mcf; Steam, bbl (water equivalent)	Maximum number of wells used for injection
Cyclic-steam	1964	14,142,183	478

SPACING ACT: Does not apply

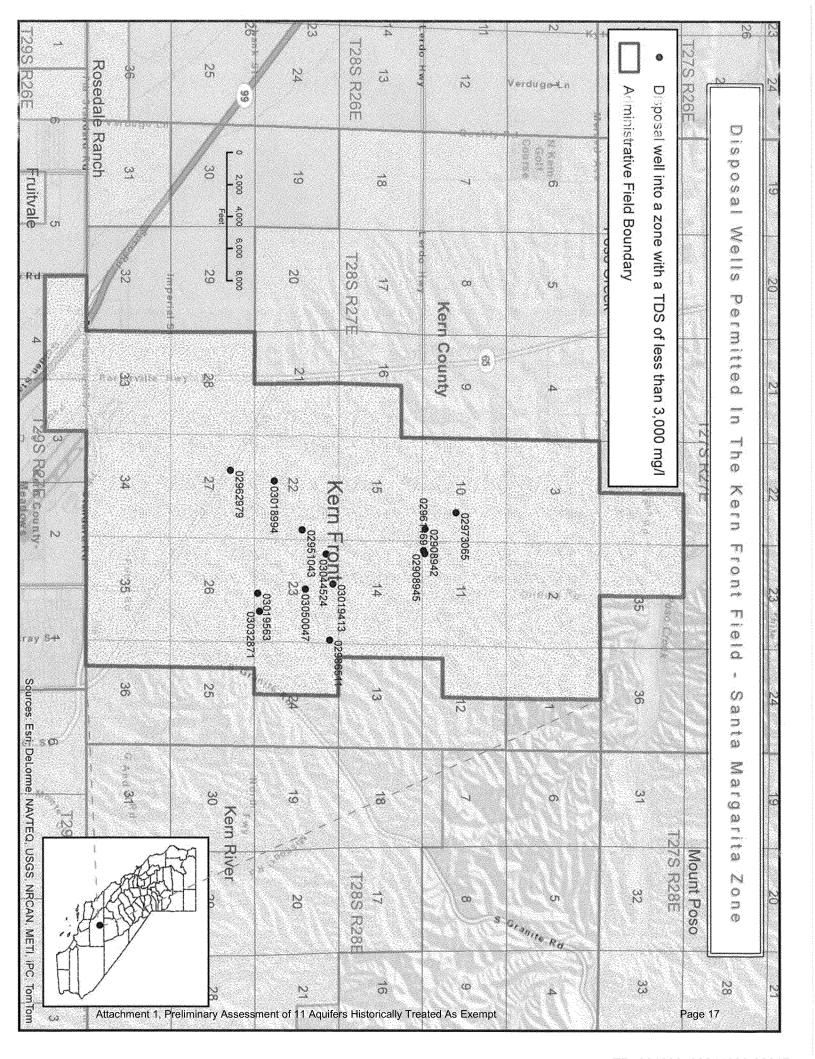
BASE OF FRESH WATER: 1,300

CURRENT CASING PROGRAM: 8 5/8" cem. above zone and across base of fresh-water sands; 6 5/8" liner landed through zone.

METHOD OF WASTE DISPOSAL: Unlined sumps.

REMARKS: A steam displacement project was started in the Kern River - Chanac zone in 1966 and terminated after 99,587 bbls. was injected.

REFERENCES: Brooks, T.J., Kern Front Oil Field, A.A.P.G., S.E.P.M., S.E.C., Guidebook Joint Annual Meeting, Los Angeles, Calif., 1952, p. 159-161. Park, W.H., Kern Front Oil Field; Calif. Div. of Oil and Gas, Summary of Operations--Calif. Oil Fields, Vol. 51, No. 1 (1965).



Kern River Field, Chanac Zone, East Side Bakersfield District

1) Number of disposal wells permitted in the zone:

12 (10 of these are permitted in both the Santa Margarita and Chanac Zones in the Kern River field)

2) Number of active producers:

0

3) Depth of the zone where the injection wells are located:

425' to 1,335' below surface. Zone dips to the Southwest across the field.

4) Volumes injected historically since 1983:

568,987,463 Bbls, last injected on 3/1/2015

5) TDS of zone:

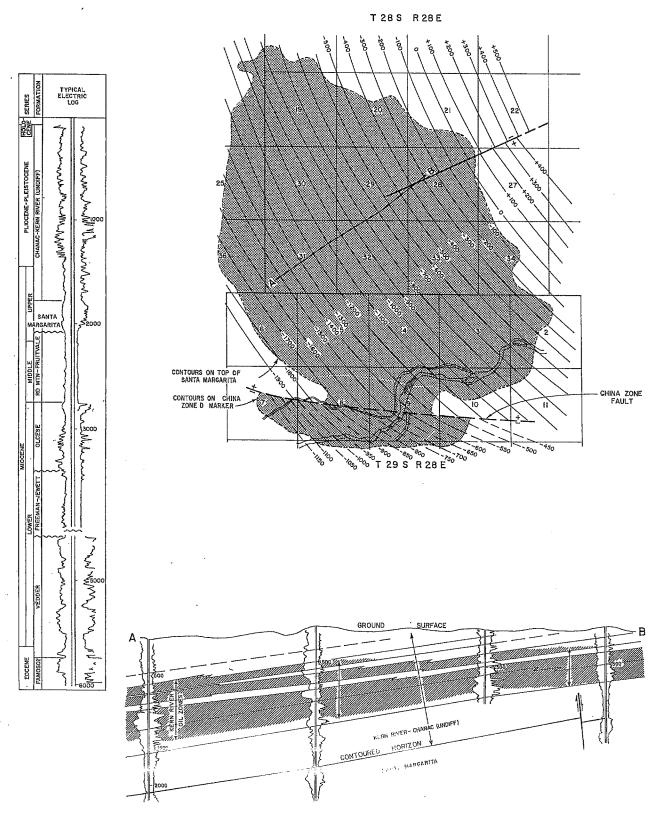
926 mg/l - 3,325 mg/l TDS

The 926 mg/l TDS sample is from well 21-4 top zone perf 1,220-1,223 " (upper Chanac) on 05/22/1978 and sample 3,325 mg/l TDS sample is from Chanac Zone KCL-10 2x" on 2/11/1987.

6) TDS of injection water:

491 mg/l - 2,000 mg/l TDS

The 491 mg/l TDS sample is from "Jost Plant Sec. 10, T29S/28E Waste disposal plant tank" on 11/23/1999 and sample 2,000 mg/l TDS sample is from "Cogen Disposal Water" on 11/26/1997. Permitted fluid in the Chanac zone, Kern River field consists of produced Kern River produced water from Kern River field and cogen waste.



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LOCATION: 5 miles north of Bakersfield

TYPE OF TRAP: Permeability variations on a homocline

ELEVATION: 400 - 1,000

DISCOVERY DATA

					l dally setion	
Zone	Present operator and well name	Original operator and well name	Sec. T. & R.	 	Gas (Mcf)	Date of completion
Kern River	Elwood Brothers (no name well) \\ Westates Petroleum Co. "KCL" 1	Same as present Horace Steele and L.C. Gould "KCL" 1	3 29S 28E 8 29S 28E	N.A. 50	N.A. 0	1899 Sep 1947
					- Control of the Cont	

Remarks: The discovery well was dug by hand in the spring of 1899 on what is now Chanslor-Western Oil Development Co. property. "Gassy vapors" caused the well to be abandoned without a test of its commercial possibilities. In June 1899 McWhorter Bros. drilled the first commercial well 400 feet north of the discovery well.

DEEPEST WELL DATA

		Date			.Depth	At total d	epth
Present operator and well name	Original operator and well name	started		8 & M	(feet)	Strata	Age
Standard Oil Co. of Calif. "KCL'26" 1-11	Same .	Oct 1948	9 29S 28E	MD	6,986	Granite	Jurassic

PRODUCING ZONES

	Average	Average net thickness	G	eologic	Oil gravity (°API) or	Salinity of zone water	Class BOPE
Zone	depth thickness (feet) (feet)		Age	Age Formation		gr/gal	regulred
Kern River	900	700	late Pliocene	Kern River	13	5	None
China Zone	1,300	100 - 500	late Pliocene	Kern River	13	40	None
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				·			
	1	1		1			

PRODUCTION DATA (Jan. 1, 1973)

PRODUCTION D	AIA (jan. 1, 19/:) <i>)</i>									
1972 Production			1972 Proved Average number		Cumulative production		Peak oil production		Total number of wells		Maximum proved
Oil (bbl)	Net gas (Mcf)	Water (bbl)	Proved acreage	producing wells	Oll (bbf)	Gas (Mcf)	Barrels	Year	Drilled	Completed	acreage
27,154,427	4,165	188,121,732	9,535	4,526	576,511,857	2,599,678	27,154,427	1972	7,942	6,978	9,850

STIMULATION DATA (Jan. 1, 1973)

Type of Date project started		Cumulative injection - Water, bbi; Gas, Mcf; Steam, bbi (water equivalent)	Maximum number of wells used for injection			
Cyclic-steam	1961	300,849,501	is .	5,215		
Steam flood	1962	189,380,134		780		

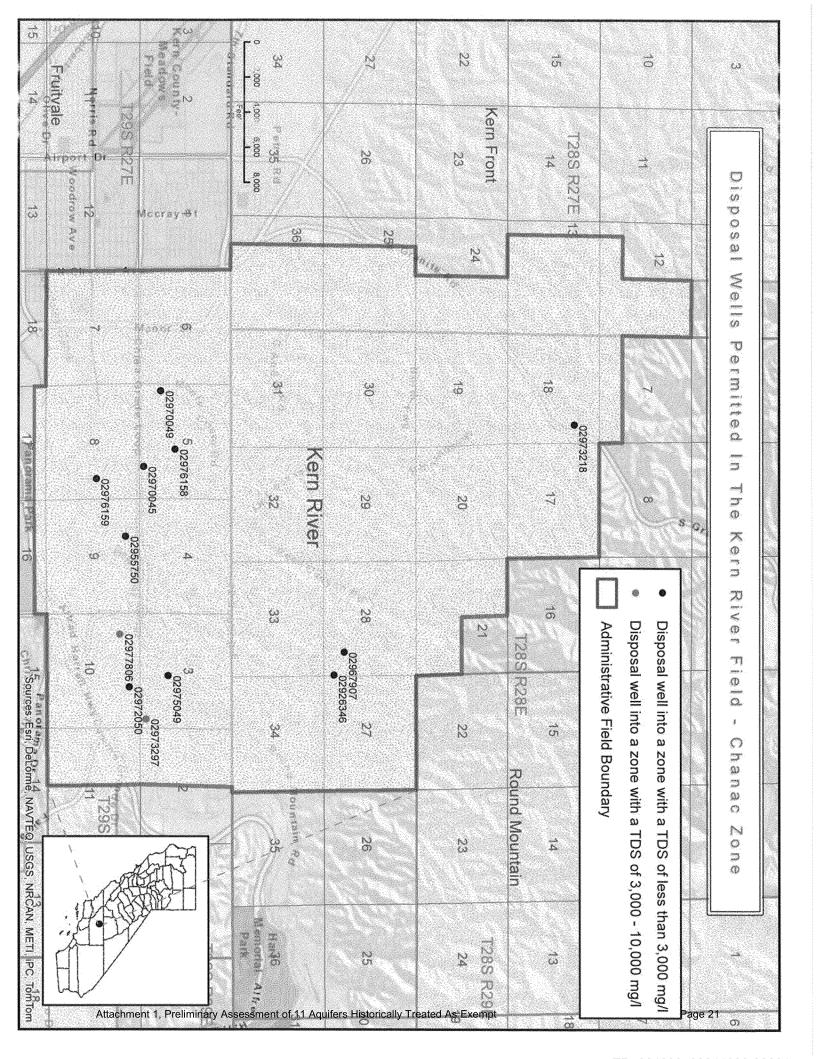
SPACING ACT: Does not apply

BASE OF FRESH WATER: 2,500

CURRENT CASING PROGRAM: 6 5/8" cem. through zone.

METHOD OF WASTE DISPOSAL: Waste water is injected into the Santa Margarita and Vedder, 12,143,578 bbls. in 1972. Waste water is also used in steam generation. The balance of the water is of a suitable enough quality that it is allowed to enter percolation ponds, irrigation canals, & the Kern River REMARKS:

REFERENCES. Crowder, R.E., Ecrn River Oil Field: Calif. Div. of Oil and Gas, Summary of Operations -Calif. Oil Fields, Vol. 38, No. 2 (1952).



Kern River Field, Santa Margarita Zone, East Side Bakersfield District

- 1) Number of disposal wells permitted in the zone:
 32 (10 of these are permitted in both the Santa Margarita and Chanac Zones in the Kern River field)
- 2) Number of active producers : 0
- 3) Depth of the zone where the injection wells are located: 760' to 2,285' below surface. Zone dips to the Southwest across the field.
- 4) Volumes injected historically since 1983: 799,041,272 Bbls, last injected on 3/1/2015
- 5) TDS of zone:

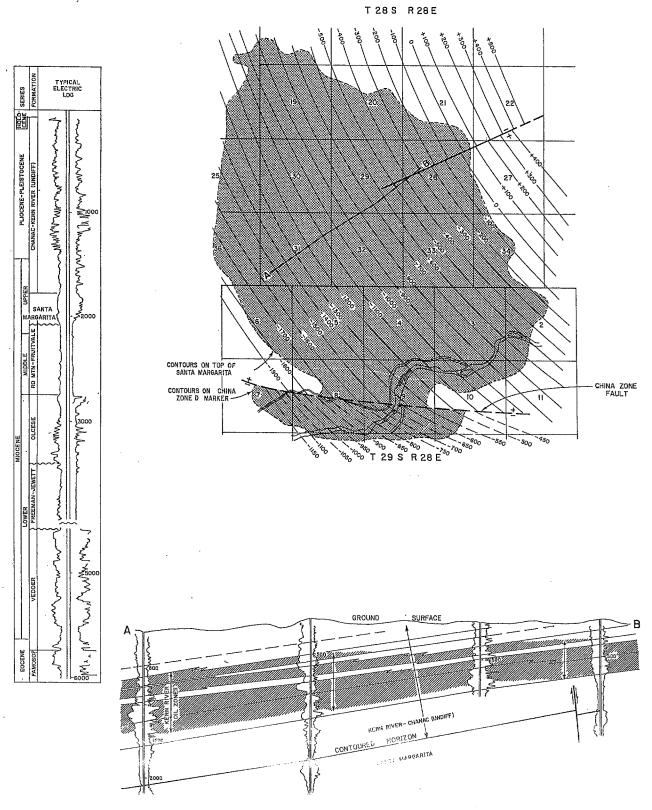
490 mg/l - 1,584 mg/l TDS

The 490 mg/l TDS sample is from "KCL - 10 Well #2X" (perf 1,068 - 1,196') on 12/30/1985 and the 1,584 mg/l TDS sample is from "'Rambler" 71 W" (perf 1,667-1,875') on 12/22/1965.

6) TDS of injection water:

491 mg/l - 855 mg/l and 74,924 mg/l TDS

The 491 mg/l TDS sample is from the "Jost plant Sec. 10 T29S/28E Waste Disposal Tank" on 11/23/1999, the 855 mg/l TDS sample is from the "Overland plant Sec. 28 T28S/R28E, produced water injection tank" on 11/23/1999, and the 74,924 mg/l is from the "Overland plant Sec. 28 T28S/R28E Brine Disposal Tank" (project 34000035). Permitted fluids for injection into the Santa Margarita zone, Kern River field consist of Kern River produced water, cogeneration and regeneration brine.



Attachment 1, Preliminary Assessment of 11 Aquifers Historically Treated As Exempt

Page 23

LOCATION: 5 miles north of Bakersfield

TYPE OF TRAP: Permeability variations on a homocline

ELEVATION: 400 - 1,000

DISCOVERY DATA

Diodo (Mil)					Initia	daily uction	
Zone	Present operator and well name	Original operator and well name	Sec. T. & R.			Gas (Mcf)	Date of completion
Kern River China Zone	Hiwood Brothers (no name well) Westates Petroleum Co. "KCL" 1	Same as present Horace Steele and L.C. Gould "KCL" 1	3 29S 28E 8 29S 28E		N.A. 50	N.A. 0	1899 Sep 1947

Remarks: The discovery well was dug by hand in the spring of 1899 on what is now Chanslor-Western Oil Development Co. property. "Gassy vapors" caused the well to be abandoned without a test of its commercial possibilities. In June 1899 McWhorter Bros. drilled the first commercial well 400 feet north of the discovery well.

DEEPEST WELL DATA

DEEL NOT A PROPERTY OF THE PRO		Date			.Depth	At total d	epth
Present operator and well name	Original operator and well name	started	5ec. T. & R.		(feet)	Strata	Age
Standard Oil Co. of Calif. "KCL 26" 1-11	Same .	Oct 1948	9 29S 28E	MD	6,986	Granite	Jurassic

PRODUCING ZONES

	Average	Average net thickness	G	ieologic	Oll gravity (*API) or	Satinity of zone water	Class BOPE
Zone	depth (feet)	(feet)	Age	Formation	Gas (btu)	gr/gal	required
Kern River China Zone	900 1,300	700 100 - 500	late Pliocene late Pliocene	Kern River Kern River	13	5 40	None None

PRODUCTION DATA (Jan. 1, 1973)

	1972 Production		1972	1972 Average number	Cumulative	production	Peak oil prod	ıctlon	Total num	per of wells	Maximum proved
Oli (bbl)	Net gas (Mcf)	Water (bb1)	Proved acreage	producing wells	O1) (bbf)	Gas (Mcf)	Barrels	Year	Drilled	Completed	acreage
27,154,427	4,165	188,121,732	9,535	4,526	576,511,857	2,599,678	27,154,427	1972	7,942	6,978	9,850

STIMULATION DATA (Jan. 1, 1973)

Type of project	Date started	Cumulative injection - Water, bbl; Gas, Mcf; Steam, bbl (water equivalent)	Maximum number of wells used for injection			
Cyclic-steam	1961	300,849,501	è	5,215		
Steam flood	1962	189,380,134		780		

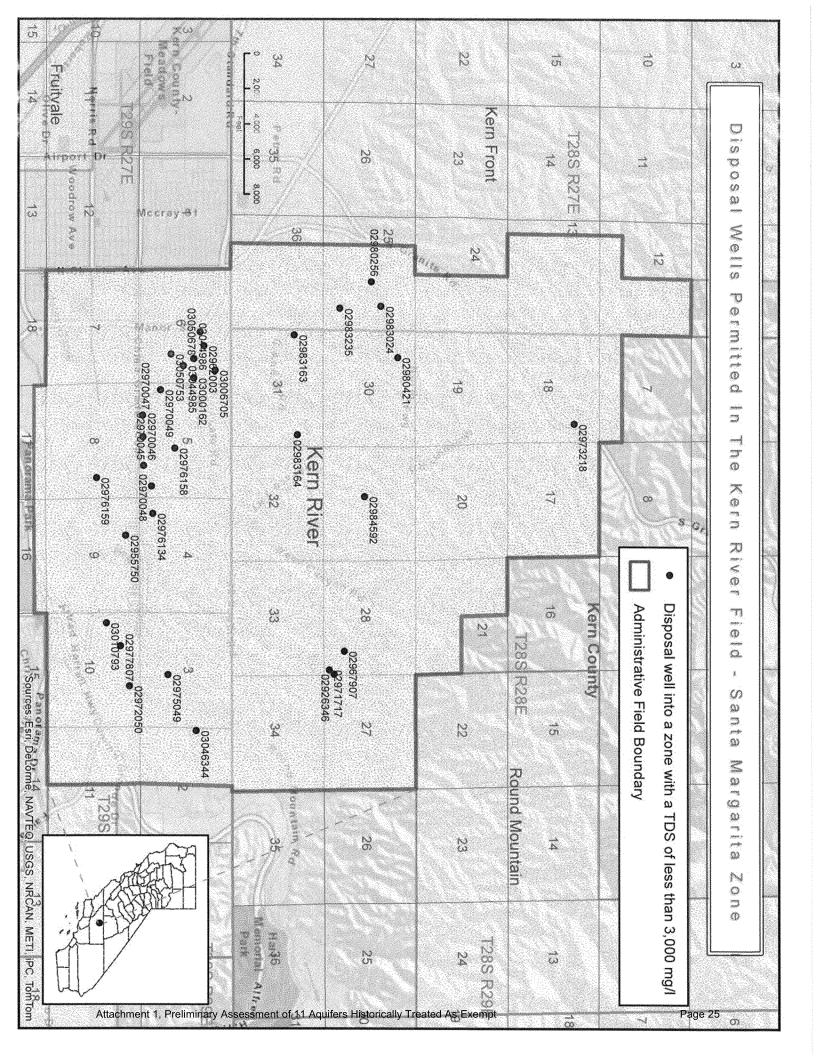
SPACING ACT: Does not apply

BASE OF FRESH WATER: 2,500

CURRENT CASING PROGRAM: 6 5/8" cem, through zone.

METHOD OF WASTE DISPOSAL: Waste water is injected into the Santa Margarita and Vedder, 12,143,578 bbls. in 1972. Waste water is also used in steam generation. The balance of the water is of a suitable enough quality that it is allowed to enter percolation ponds, irrigation canals, & the Kern River REMARKS:

REFERENCES Crowder, R.E., Fern River Oil Field: Calif. Div. of Oil and Gas, Summary of Operations -- Calif. Oil Fields, Vol. 38, No. 2 (1952).



Mount Poso Field, Walker Zone, East Side Bakersfield District

1) Number of disposal wells permitted in the zone:

5

2) Number of active producers in the zone:

C

3) Depth of the zone where the injection wells are located:

1,740' to 1,796' below surface (top of the Vedder/Walker zone). Injected only in combination with the laterally interfingered Vedder, which extends throughout the field.

4) Volumes injected historically since 1983:

63,777,556 Bbls, last injected on 3/1/2015

5) TDS of zone:

1,069 mg/I TDS

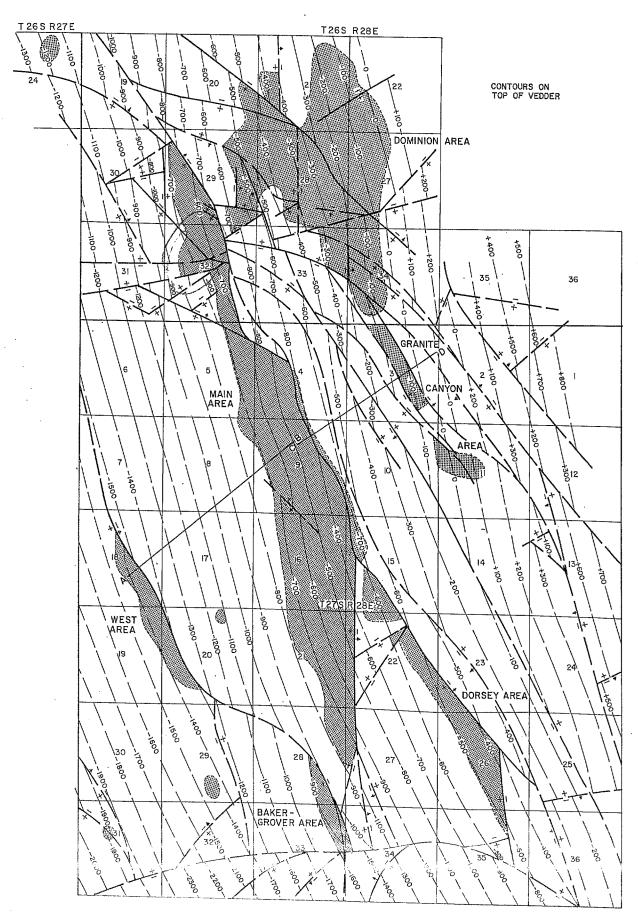
The 1,069 mg/l TDS zone sample is from "Black Foot Sump" on 05/31/1973.

6) TDS of injection water:

650 mg/l TDS

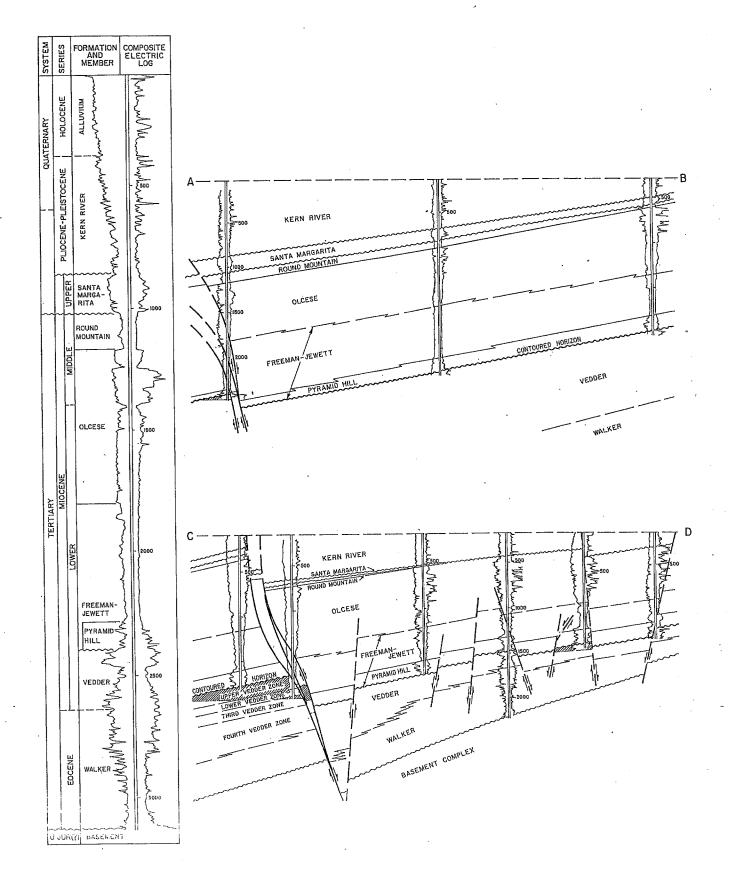
The 650 mg/l TDS sample is from "Shapiro 234 Water Sample from Water Disposal" on 12/4/2008.

MOUNT POSO OIL FIELD



Attachment 1, Preliminary Assessment of 11 Aquifers Historically Treated As Exempt

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Attachment 1, Preliminary Assessment of 11 Aquifers Historically Treated As Exempt

Kern County

LOCATION: 13 miles northeast of Bakersfield

TYPE OF TRAP: See areas ELEVATION: 650 - 1,450

DISCOVERY DATA

Zone	Present operator and well name	Original operator and well name	Sec. T. & R.	B&M	OH	dally uction Gas (Mcf)	Date of completion
Pyramid Hill and Upper Vedder	Shell Oil Co. "Vedder" 1	Shell Co. of California "Vedder" 1	9 27S 28E		300	N.A.	Jul 1926

Remarks:

DEEPEST WELL DATA

Description and the state of th		Date			Depth	At total d	lepth
Present operator and well name	Original operator and well name	started				Strata	Age
Pacific Oil and Gas Dev. Corp. "City of San Francisco" 56-32	Same	Aug 1957	32 27S 28E	MD	3,759	Wa1ker	Eocene

PRODUCING ZONES (See areas)

	Average depth	Average net thickness	Geologic		Oil gravity	Salinity of	Class BOPE
Zone	(feet)	(feet)	Age	Formation	(°API) or Gas (btu)	zone water gr/gal	required
		and the same of th					
		-					

PRODUCTION DATA (Jan. 1, 1973)

<u> </u>			1972 Proved	1972 Average number	Cumulative	production	Peak oil prod		Total num	ber of wells	Maximum proved
O11 (PP1)	Net gas (Mct)	Water (bb1)	acreage	producing wells	O11 (bb1)	Gas (Mcf)	Barrels	Year	Drilled	Completed	acreage
1,830,017	728	84,316,129	3,630	532	164,558,017	1,977,245	8,427,304	1943	1,184	828	3,805

STIMULATION DATA (Jan. 1, 1973) (See areas)

Type of project	Date started	Cumulative injection - Water, bbl; Gas, Mcf; Steam, bbl (water equivalent)	. Maximum number of wells used for injection

SPACING ACT: See areas.

BASE OF FRESH WATER: See areas.

CURRENT CASING PROGRAM: See areas.

METHOD OF WASTE DISPOSAL: See areas.

REMARKS:

REFERENCES: Albright, M.B., A.G. Hluza, and J.C. Sullivan, Mount Poso Oil Field, Calif. Div. of Oil and Gas, Summary of Operations--Calif. Oil Fields, Vol. 45, No. 2 (1957).

14.3

BAKER - GROVER AREA

Kern County

LOCATION. See map sheet of Mount Poso Oil Field

TYPE OF TRAP: Faulted regional homocline

ELEVATION: 650 - 1,050

DISCOVERY DATA

Zone	Present operator and well name	Original operator and well name	Sec. T. & R.	B&M	Oit	dally uction Gas (Mcf)	Date of completion
Upper Vedder	Emjayco "Baker" 1	Baker-Grover Co. "Baker" 1	33 27S 28E	MD	250	N.A.	Ju1 1935

Remarks:

DEEPEST WELL DATA

		Date			Depth	At total d	epth
Present operator and well name	Original operator and well name	started	Sec. T. & R.	8 & M	(feet)	Strata	Age
The White Hills Oil Co. No. 1	Ralph R. Whitehill No. 1	Apr 1961	34 27S 28E	MD	2,483	Vedder	early Mio

PRODUCING ZONES

	Average depth	Average net thickness	G	eologic	Oil gravity (°API) or	Salinity of zone water	Class BOPE
Zone	(feet)	(feet)	Age	Formation	Gas (btu)	gr/gal	required
Upper Vedder	1,750	25	early Miocene	Vedder	15	190	None
	•	SALE AND ADDRESS OF THE ADDRESS OF T					
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PRODUCTION DATA (Jan. 1, 1973)

PRODUCTION D	A LA (Jan. 1, 17/2	71									
	1972 Production		1972 Proved	1972 Average number	Cumulative	production	Peak oil prod	uction	Total num	ber of wells	Maximum proved
Oll (bbl)	Net gas (Mcf)	Water (bbl)	acreage	producing wells	Oil (bbl)	Gas (Mcf)	Barrels	Year	Drilled	Completed	acreage
9,991	0	883,158	80	4	3,700,652	0	276,899	1937	49	23	90

STIMULATION DATA (Jan. 1, 1973)

Type of project	Date started	Cumulative injection - Water, bbl; Gas, Mcf; Steam, bbl (water equivalent)	Maximum number of wells used for injection

SPACING ACT: Applies

BASE OF FRESH WATER: 1,100

CURRENT CASING PROGRAM: 7" cem. above zone; 5 1/2" liner landed through zone.

METHOD OF WASTE DISPOSAL: Evaporation and percolation sumps (to be phased out).

REMARKS:

REFERENCES

MOUNT POSO OIL FIELD

Kern County

LOCATION: See map sheet of Mount Poso Oil Field

TYPE OF TRAP: Faulted homocline; lithofacies variations

ELEVATION: 1,100 - 1,350

DISCOVERY DATA

DOMINION AREA

Zone	Present operator and well name	Original operator and well name	Sec. T. & R.	B & M	OH	il daily uction Gas (Mcf)	Date of completion
Vedder	Robert B. Doe, "Dominion" 2	A. Bruce Frame "Dominion" 2	28 26S 28E	MD	435	N.A.	Dec 1928

Remarks:

DEEPEST WELL DATA

		Date			Depth	At total d	lepth
Present operator and well name	Original operator and well name	started	Sec. T. & R.	8 & M		Strata	Age
Glen H. Mitchell "SP" 1	Same	May 1945	33 26S 28E	MD	2,512	Schist	Late Jur
		1			ł	ł	ſ

PRODUCING ZONES

	Average depth	Average net thickness	6	Geologic	Oil gravity (°API) or	Salinity of	Class BOPE
Zone	(feet)	(feet)	Age	Formation	Gas (btu)	zone water gr/gal	required
Vedder	1,560	35	early Miocene	Vedder	15	10	None
						1	
	1	i	I	1	1		

PRODUCTION DATA (Jan. 1, 1973)

-	1972 Production		1972 Proved	1972 Average number	Cumulative	production	Peak oil prod	uction	Total num	ber of wells	Maximum proved
Oil (bbl)	Net gas (Mcf)	Water (bb1)	acreage	producing wells	Oil (bbl)	Gas (Mcf)	Barrels	Year	Orliled	Completed	acreage
107,317	0	4,482,093	675	74	5,735,208	0	197,189	1933	195	128	690
		Į.									

STIMULATION DATA (Jan. 1, 1973)

Type of project	Date started	Cumulative injection - Water, bbl; Gas, Mcf; Steam, bbl (water equivalent)	Maximum number of wells used for injection
Cyclic-steam	1964	177,242	12

SPACING ACT: Does not apply

BASE OF FRESH WATER: No saline waters present

CURRENT CASING PROGRAM: 7" cem. above zone; 5 1/2" liner landed through zone.

METHOD OF WASTE DISPOSAL. Injection into the Vedder; evaporation and percolation sumps.

REMARKS:

REFERENCES:

MOUNT POSO OIL FIELD

DORSEY AREA

Kern County

LOCATION: See map sheet of Mount Poso Oil Field

TYPE OF TRAP: Faulted homocline

ELEVATION. 900 - 1,250

DISCOVERY DATA

					prod	il daily uction	
Zone	Present operator and well name	Original operator and well name	Sec. T. & R.	B & M	(bbl)	Gas (Mcf)	Date of completion
Upper Vedder	Thomas Oil Co. "Dorsey" 2	R.S. Lytle "Dorsey" 2	26 27S 28E	MD	570	N.A.	Sep 1928
	4						

Remarks:

DEEPEST WELL DATA

		Date			Depth	At total d	epth
Present operator and well name	Original operator and well name	started	Sec. T. & R.	8 & M	(feet)	Strata	Age
Emjayco "Glide" 15-1	Harry H. Magee, Opr. "Glide" 15-1	Oct 1956	15 27S 28B	MD	2,000	Vedder	early Mio

PRODUCING ZONES

	Average depth	Average net thickness		Geologic	Oll gravity (°API) or	Salinity of zone water	Class BOPE
Zone (feet)		(feet)	Age	Formation	Gas (btu)	gr/gal .	required
per Vedder	1,500	30	early Miocene	Vedder	16	5	None
-							•
,							

PRODUCTION DATA (Jan. 1, 1973)

	1972 Production		1972 1972 Proved Average number		Cumulative	Peak oil prod	uction	Total num	Maximum proved	•		
Oli (bbi)	Net gas (Mcf)	Water (bbl)	acreage	producing wells	Oil (bbl)	Gas (Mcf)	Barrels	Year	Drilled	Completed	acreage	
86,429	0	1,913,270	375	47	4,676,008	0	204,880	1958	142	76	410	

STIMULATION DATA (Jan. 1, 1973)

Type of project	Date started	Cumulative injection - Water, bbi; Gas, Mcf; Steam, bbi (water equivalent)	Maximum number of wells used for injection

SPACING ACT: Does not apply

BASE OF FRESH WATER: Basement

CURRENT CASING PROGRAM: 8 5/8" cem. above zone; 6 5/8" liner landed through zone.

METHOD OF WASTE DISPOSAL: Percolation and evaporation sumps on outcrop of Round Mountain Silt; injection wells.

REMARKS: Vedder zone water contains 1.75 ppm boron.

REFERENCES:

GRANITE CANYON AREA

MOUNT POSO OIL FIELD

Kern County

LOCATION: See map sheet of Mount Poso Oil Field

TYPE OF TRAP: Faulted homocline; lithofacies variations

ELEVATION: 1,300

DISCOVERY DATA

Zone	Present operator and well name	Original operator and well name	Sec. T. & R.	B & M	prod	I daily uction Gas (Mcf)	Date of completion
Upper Vedder	Road Oil Sales, Inc. "SP" 2	J.J. Chevalier "Southern Pacific" 2	3 27S 28E	MD	50	N.A.	Nov 1936
		-		-			

Remarks:

DEEPEST WELL DATA

		Date			Depth	At total d	epth
Present operator and well name	Original operator and well name	started	Sec. T. & R.	8 & M		Strata	Age
Lyle A. Garner & Assoc. "S.P." 3-1	Same	May 1952	3 27S 28E	MD	2,226	Granite	Late Jur

PRODUCING ZONES

	Average depth	Average net thickness	G	iealogic	Oil gravity (°API) or	Salinity of	Class BOPE required None	
Zone	(feet)	(feet)	Age	Formation	Gas (btu)	zone water gr/gal		
Upper Vedder	1,390	30	early Miocene	Vedder	15	10		
					1			
					,			
	1							

PRODUCTION DATA (Jan. 1, 1973)

1972 Production		1972 1972 Proved Average number		Cumulative production		Peak oll production		Total num	Maximum proved		
Oil (bbl)	Net gas (Mcf)	Water (bbl)	acreage	producing wells	Oil (bb1)	Gas (Mcf)	Barrels	Year	Drilled	Completed	acreage
3,808	0	20,675	80	10	823,450	0	65,780	1949	65	30	130

STIMULATION DATA (Jan. 1, 1973)

Type of project	Date started	Cumulative injection - Water, bbf; Gas, Mcf; Steam, bbl (water equivalent)	Maximum number of wells used for injection

SPACING ACT: Applies

BASE OF FRESH WATER: Basement

CURRENT CASING PROGRAM: 8 5/8" cem. above zone; 6 5/8" liner landed through zone.

METHOD OF WASTE DISPOSAL: Evaporation sumps on outcrop of Round Mountain Silt.

REMARKS: A cyclic-steam project was started in 1967 and discontinued after 19,069 bbls. of water in the form of steam were injected. A pilot fire flood project, initiated in 1963, was terminated in 1965.

REFERENCES:

Q2.5

Kern County

LOCATION: See map sheet of Mount Poso Oil Field

TYPE OF TRAP: Faulted homocline

ELEVATION: 700 - 1,450

DISCOVERY DATA

Present operator and well name	Original operator and well name	Sec. T. & R.	B&M	Oll (bbl)	Gas (Mcf)	Date of completion
Shell Oil Co. "Vedder" l	Shell Oil Co. of Calif. "Vedder" 1	9 27S 28E	MD	300	N.A.	Jul 1926
Shell Oil Co. "Vedder" 6	Same as present Unknown			835 N.A.	N.A. N.A.	Jan 1933 Prior to
,		or 9				1957 Aug 1957
oneri di co. dizac d	Stand Lo propont	20 210 202				1.00
	Shell Oil Co. "Vedder" l	Shell Oil Co. "Vedder" 1 Shell Oil Co. "Vedder" 6 Unknown Shell Oil Co. "Vedder" 6 Unknown	Shell Oil Co. "Vedder" 1 Shell Oil Co. of Calif. "Vedder" 1 9 275 28E	Shell Oil Co. "Vedder" 1 Shell Oil Co. of Calif. "Vedder" 1 9 275 28E MD	Present operator and well name	Shell Oil Co. "Vedder" 1 Shell Oil Co. of Calif. "Vedder" 1 9 275 28E MD 300 N.A.

Remarks: The first separate well that produced from the Pyramid Hill zone was Shell Oil Co. "Security" 3, Sec. 9, T. 27S., R. 28E. Initial production was 4 barrels per day.

A Commingled production from Upper Vedder and Lower Vedder.

B Commingled production from Third Vedder and Fourth Vedder.

DEEPEST	WELL	DATA
---------	------	------

		Date			Depth	At total d	epth
Present operator and well name	Original operator and well name	started	Sec. T. & R.	3 & M	(feet)	Strata	Age
Trico Industries, Inc. "USL" 6-2	Trico Oil and Gas Co. "USL" 6-2	Jul 1960	6 27S 28E	MD	2,665	Vedder	early Mio

	Average depth	Average net thickness	G	ieologic	Oil gravity (*API) or	Salinity of zone water	Class BOPE required	
Zone	(feet)	(feet)	Age	. Formation	Gas (btu)	gr/gal		
Pyramid Hill	1,600	160	early Miocene	Pyramid Hill	17	N.A.	None	
Upper Vedder	1,750	140	early Miocene	Vedder	16	80	None	
Lower Vedder	1,900	80	early Miocene	Vedder	16	N.A.	None	
Third Vedder	1,985	120	early Miocene	Vedder	16	75	None	
Fourth Vedder	2,105	50	early Miocene	Vedder	16	65	None	
						1		
	[1		
					1			
					1			

FRODUCTION D	WYW () em: 1, 12/.	"									
1972 Production		1972 1972 Proved Average number		Cumulative production		Peak oil production		Total number of wells		Maximum proved	
Oil (bbl)	Net gas (Mcf)	Water (bbl)	acreage	producing wells	(1dd) 110	Gas (Mcf)	Barrels	Year	Drilled	Completed	acreage
1,590,436	728	75,595,054	2,225	374	146,734,300	1,977,245	7,982,576	1943	641	524	2,265

STIMULATION DATA (Jan. 1, 1973)

Type of project	Date started	Cumulative injection - Water, bbi; Gas, Mcf; Steam, bbi (water equivalent)	Maximum number of wells used for injection
Steam flood	1963	9,351,042	11

SPACING ACT: Does not apply

BASE OF FRESH WATER: 1,000 - 1,500

CURRENT CASING PROGRAM: 8 5/8" cem. above zone and across base of fresh-water sands; 6 5/8" liner landed through zone.

METHOD OF WASTE DISPOSAL: Evaporation and percolation sumps; injection into Vedder sand.

REMARKS: A cyclic-steam project was started in 1963 and discontinued after 116,623 bbls. of water in the form of steam was injected. A water flood project was started in 1952 and discontinued after 608,470 bbls. of water was injected.

REFERENCES:

WEST AREA

MOUNT POSO OIL FIELD

Kern County

LOCATION: See map sheet of Mount Poso Oil Field

TYPE OF TRAP: Faulted homocline with permeability variations

ELEVATION: 700 - 1,075

DISCOVERY DATA

Zone Upper Vedder	Present operator and well name	Original operator and well name	Sec. T. & R.	B & M	OU	daily uction . Gas (Mcf)	Date of completion
opper vedder	Thomas Oil Co. "Ring 18" 1	Dwight G. Vedder No. 1	18 275 28E	MD	0	5,300	Dec 1943
•	,						

Remarks: Gas cap was of limited volume. After being shut in for one year the discovery well was recompleted producing oil.

DEEPEST WELL DATA

Present operator and well name		Date			Depth	At total depth		
	Original operator and well name		Sec. T. & R.		1,000	Strata	Age	
Pacific Oil & Gas Dev. Corp. "City of San Francisco" 56-32	Same .	Aug 1957	32 27S 28E	MD	3,759	Walker	Eocene	

PRODUCING ZONES

	Average depth	Average net thickness	G	ieologic	Oil gravity	Salinity of	01
Zone	(feet)	(feet)	Age	Formation	(°API) or Gas (btu)	zone water gr/gal	Class BOPE regulred
Upper Vedder	2,575	15 - 50	early Miocene	Vedder	16	60	None
•				.			
						1	
]					1	

PRODUCTION DATA (Jan. 1, 1973)

1972 Production		Proved Average number Cui			ve production Peak oil production		uction	Total number of wells		Maximum	
Oll (bbl)	Net gas (Mcf)	Water (bbl)	acreage	producing wells	Oil (bbl)	Gas (Mcf)	Barrels	Year	Drilled	Completed	proved acreage
32,036	0	1,421,879	195	23	2,888,399	0	190,765	1957	92	47	220

STIMULATION DATA (Jan. 1, 1973)

Type of project	Date started	Cumulative injection - Water, bbl; Gas, Mcf; Steam, bbl (water equivalent)	Maximum number of wells used for injection

SPACING ACT: Applies

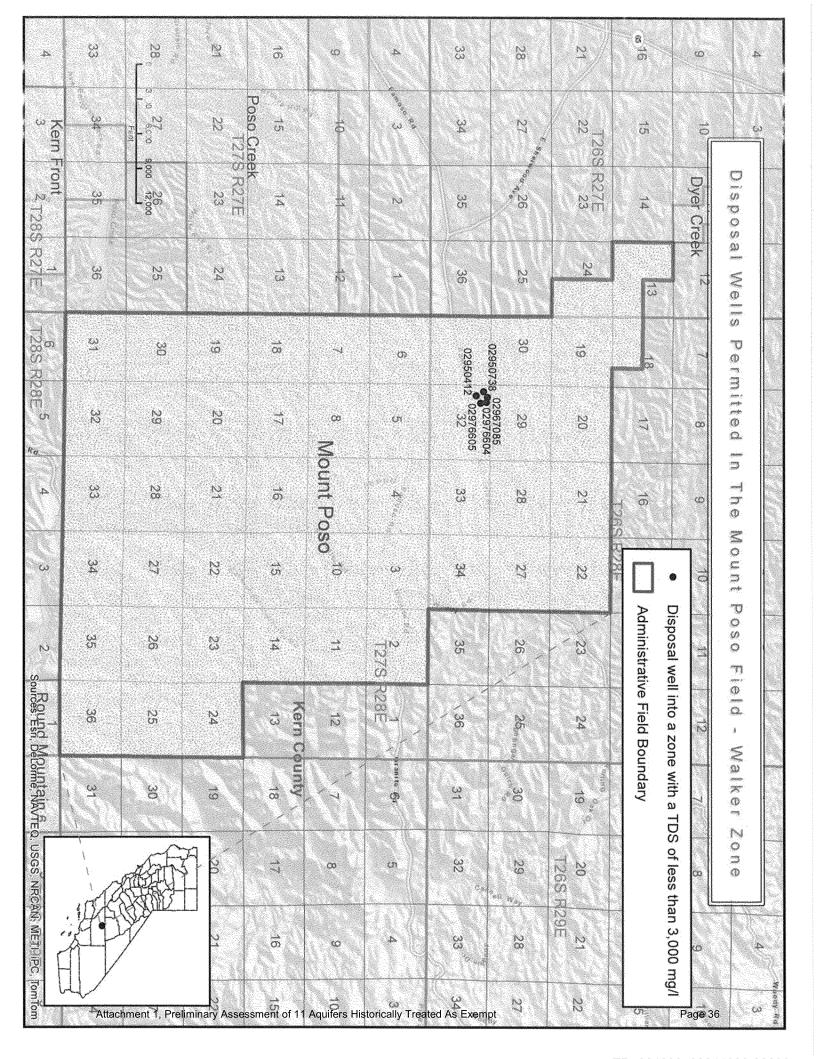
BASE OF FRESH WATER: 1,800

CURRENT CASING PROGRAM: 7" cem. above zone and across base of fresh-water sands; 5 1/2" liner landed through zone.

METHOD OF WASTE DISPOSAL: Evaporation and percolation sumps (to be phased out).

REMARKS: Vedder zone water contains 3 to 4 ppm boron.

REFERENCES:



Round Mountain Field, Olcese Zone, East Side Bakersfield District

1) Number of disposal wells permitted in the zone: 6 (4 wells are permitted in both the Olcese and Walker Zones in Rour

6 (4 wells are permitted in both the Olcese and Walker Zones in Round Mountain Field)

2) Number of active producers:

0

3) Depth of the zone where the injection wells are located:

710' to 850' below surface. These zone depths are from wells API #029-18114 and API #029-18119, which are currently injecting in the Olcese zone. The remaining wells in the field (029-47441, 029-47543, 030-51960 and 030-51959) are permitted to inject in the Olcese, Freeman-Jewett, Vedder and Walker but are currently perforated in the Vedder and/or Walker zones only. For these 4 wells there are no logs available that pick the top of the Olcese zone since there is no injection there. Zone is fault bounded 1 ½ miles east of field limits, and pinches out 5 miles west of field limits.

4) Volumes injected historically since 1983:

160,798,008 Bbls, last injected on 1/1/2015

5) TDS of zone:

2,693 mg/I TDS

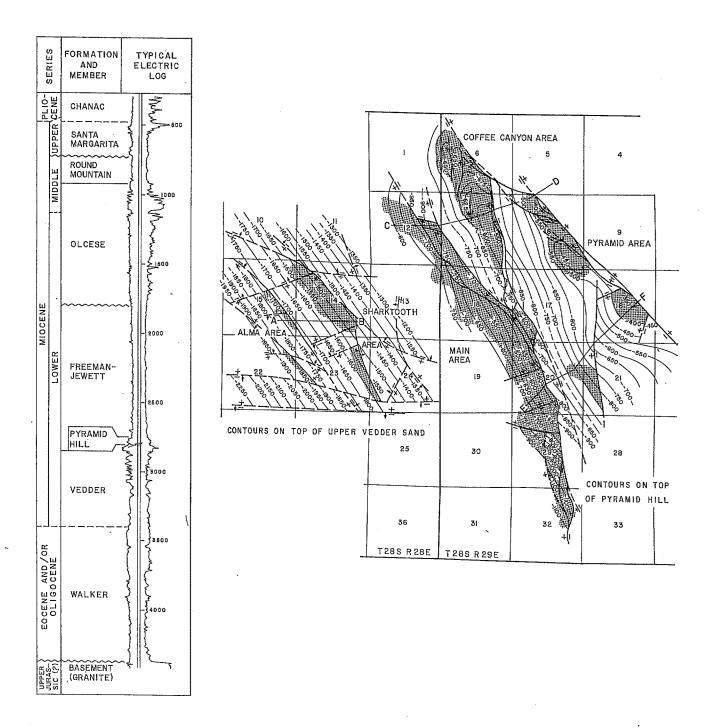
Sample collected from "water from Bishop #6 Bailer Sample at 600" on 4/27/1974.

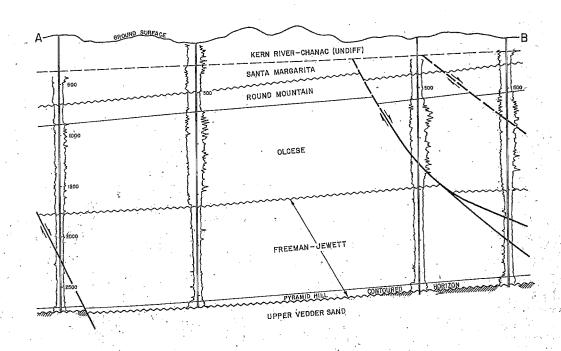
6) TDS of injection water:

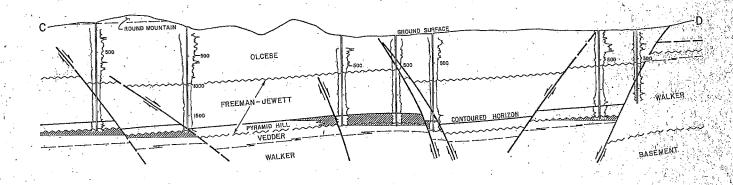
1,900 mg/I TDS

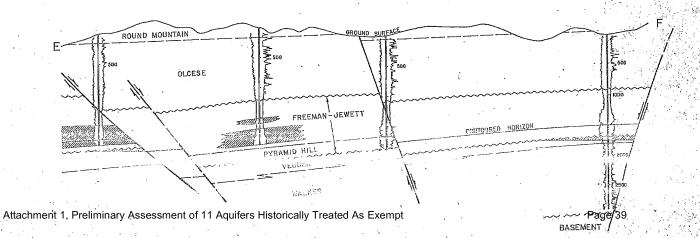
Sample collected from "Sec. 20 produced water" (Olcese WD#342 & 343) on 2/23/2009. Permitted fluids for injection into the Olcese Zone in Round Mountain field consist of Pyramid Hill, Jewett, Freeman-Jewett and Vedder zones.

ROUND MOUNTAIN OIL FIELD

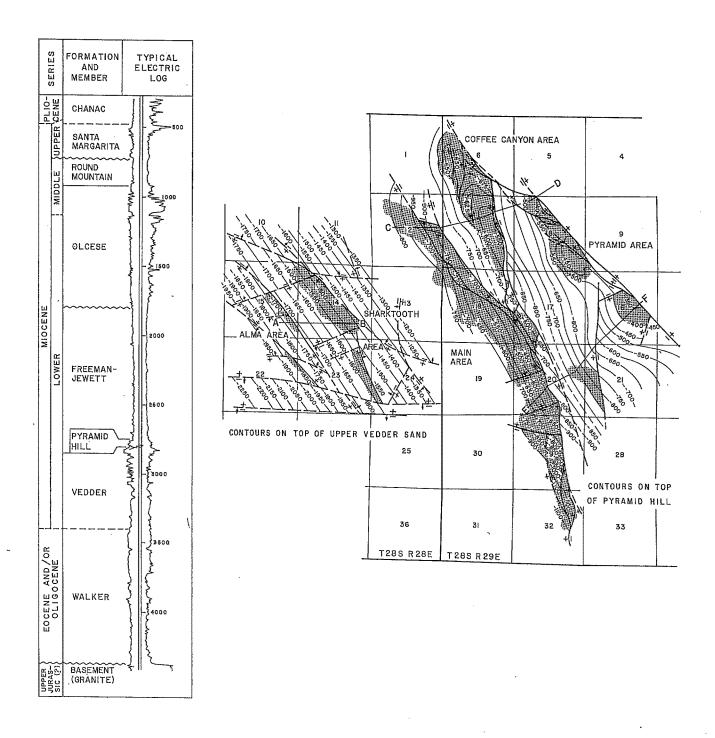








ROUND MOUNTAIN OIL FIELD



Kern County

LOCATION: 14 miles northeast of Bakersfield

TYPE OF TRAP: See areas ELEVATION: 600 - 1,500

DISCOVERY DATA

Zone	Present operator and well name	Original operator and well name	Sec. T. & R.	B & M	Oil	i dally jetion Gas (Mcf)	Date of completion
	Getty Oil Co. No. 2 Same as above Same as above	Elbe Oil Land Dev. Co. No. 2 Same as above Same as above	20 28S 29E 20 28S 29E 20 28S 29E	MD	*204 N.A. N.A.	N.A. N.A. N.A.	May 1927 May 1927 May 1927
		•					• •

Remarks: * Production listed for Jewett is the combined production rate from the Jewett, Pyramid Hill, and Vedder zones.

DEEPEST WELL DATA

		Date			Depth	. At total d	epth
Present operator and well name	Original operator and well name	started	Sec. T. & R.	8 & M		Strata	Age
C.C. Killingsworth "Alma" 6	Barnsdall Oil Co. "Alma" 6	Mar 1948	15 28S 28E	MÓ	4,418	Basement (Granite)	Late Jur (?)

	Average depth	Average net thickness	Ge	ologic	OII gravity (°API) or	Satinity of zone water	Class BOPE
Zoné	(feet)	(feet)	, Age	.Formation	Gas (btu)	gr/gal .	required
			Í				
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£.,							
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PRODUCTION DATA (Jan. 1, 1973)

	1972 Production		1972 Proved	1972 Average number	Cumulative	production	Peak oll prod	uction	Total num	ber of wells	Maximum proved
Oil (bbl)	Net gas (Mcf)	Water (bbl)	acreage	producing wells	Oil (bb])	Gas (Mcf)	Barrels	Year	Drilled	Completed	acreage
711,406	46,635	48,630,496	2,435	292	89,199,121	1,424,213	5,453,194	1938	665	468	2,590

STIMULATION DATA (Jan. 1, 1973) (See areas)

Type of project	Date , started	Cumulative Injection - Water, bbl; Gas, Mcf; Steam, bbl (water equivalent)	Maximum number of wells used for injection

SPACING ACT: See areas.

BASE OF FRESH WATER: See areas.

CURRENT CASING PROGRAM: See areas.

METHOD OF WASTE DISPOSAL: See areas.

REMARKS:

REFERENCES: See areas.

ALMA AREA

CALIFORNIA DIVISION OF OUT AND CAS ROUNTAIN OIL FIBED

Kern Coun

LOCATION: See map sheet of Round Mountain Oil Field

TYPE OF TRAP: Faulted homocline

ELEVATION: 700 - 1,270

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2284 Sept 45

DISCOVERY DATA

			1. 1.4	, i		- production	
Zone	Present oper	ator and well name	Original operat	or and well name	Sec. T. & R. B &		
Vedder	Harold C. Morton & H.	S. Kohlbush "Alma" 1	Same as present	grade in the second of the sec	15 28S 28E M) 152 N.A	. Feb 1947
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		!		• .			
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	1		I			,	4

Remarks:

DEEPEST WELL DATA

	DEELEST	WELLDAIA	· · · · · · · · · · · · · · · · · · ·						· · ·	1.00 7.00 50.00	74
	14.1				**	Date			Depth	At total d	epur Allina ja
		Present operator and well name.	·	Original operator and well name		started	Sec. T. & R.	B & M		Strata	Age.
				Barnsdall Oil Co. "Alma" 6		Mar 1948	15 28S 28E	MD	4,418	Basement,	Late Jur
٠.	C.C. Kill	ingsworth "Alma" 6		Barnsdari Gir Go. Rimir G						(Granite)	

PRODUCING ZONES

TRODUCTIO TITLE	Average	Average net thickness	. G	ieologic	Oil gravity (API) or	Salinity of zone water	Class BOPE
Zone	depth · (feet)	(feet)	Age	Formation	Gas (btu)	gr/gal	required
Vedder	2,600	15	early Miocene	Vedder	13	N.A.	None
	^	,	-			: :	

PRODUCTION DATA (Jan. 1, 1973)

PRODUCTION DI	rry (lan r' 121)	7					1 10 1 1 1 1 1 1		- 250	77.5	Maximum	ķ
H. 17 T. 18 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	1972 Production	,	1972	1972	Cumulative	production	Peak oil prod		Total numb	per of wells	proved	
			Proved	Average number	Oil (bbl)	Gas (Mcf)	Barrels	Year	Driffed	Completed	acreage	į
(1da) 11O:	Net gas (Mcf)	Water (bbt)	acreage	producing wells		. 0	113,392	1948	47	21	80	٠
6,240	` 0	107,447	, 50	. 3	598,904		110,402	2270	''	79		į
				.	I .	Į.	1	1 , 1		A	44. N.J. 2878	ţ

STIMULATION DATA (Jan. 1, 1973)

Type of project	Date started	Cumulative Injection - Water, bbl; Gas, Mcf; Steam, bbl (water equivalent)	Maximum number of wells used for injection
·			
			, 1

SPACING ACT: Applies

BASE OF FRESH WATER: None

CURRENT CASING PROGRAM: 8 5/8" cem. above zone; 6 5/8" liner landed through zone.

METHOD OF WASTE DISPOSAL: Evaporation and percolation sumps on outcrops of the Round Mountain Silt.

REMARKS:

REFERENCES: Albright, M.B. Jr., Sharktooth and Alma Areas of Round Mountain Oil Field: Calif. Div. of Oil and Gos, Summary of Operations, Calif. Oil Fields, Vol. 42, No. 1 (1956).

COFFEE CANYON AREA

ROUND MOUNTAIN OIL FIELD

Kern County

LOCATION: See map sheet of Round Mountain Oil Field

TYPE OF TRAP: Faulted homocline

ELEVATION: 690 - 1,300

DISCOVERY DATA

Zone	Present operator and well name	Original operator and well name	Sec. T. & R.	B & M	Oil	dally rction Gas (Mcf)	Date of completion
Pyramid Hill Vedder	Acacia Oil Co. "Coffee" 1 Acacia Oil Co. "Lindsay" 1	Reynolds Oil and Gas Co. No. 1 Lindsay Oil Co. No. 1	6 28S 29E 6 28S 29E			N.A.	Sep 1928 Aug 1928
							,
							. '

Remarks: * Production is commingled from Pyramid Hill and Vedder.

DEEPEST WELL DATA

Present operator and well name	Colotael	Date			Depth	At total d	epth	
	Original operator and well name	started.	Sec. T. & R.	8 % M	(feet)	Strata	Age	. '
Richard S. Rheem, Opr. "Smoot-Vedder" 2	Same	May 1957	1 28S 28E	MD	2,313	Vedder	early Mio	

PRODUCING ZONES

	Average depth	Average net thickness		ieologic	Oil gravity (*API) or	Salinity of	Class BOPE
Zone	(feet)	(feet)	Age	Formation	Gas (btu)	zone water gr/gal	required
Pyramid Hill Vedder	1,500 1,650	150 30	early Miocene early Miocene	Jewett Vedder	18 16	50 75	None None
			OVER 1	-			·

PRODUCTION DATA (Jan. 1, 1973)

Off (bbf) Gas (Mcf) Barrels Year Drilled Completed acreage		1972 Production		1972 Proved	1972 Average number	Cumulative	production	. Peak oil prod	uction	ber of wells	Maximum proved
103 176	OII (bbl)	Net gas (Mcf)	Water (bb1)		producing wells	Oil (bbl)		Barrels			
	103,176	0	7,292,707		50	18,507,039		1,857,108	1937	 	

STIMULATION DATA (Jan. 1, 1973)

Type of project	Date . started	Cumulative Injection - Water, bbl; Gas, Mcf; Steam, bbl (water equivalent)	Maximum number of wells used for injection
Water flood	1960	3,815,746	1
		-	

SPACING ACT: Does not apply

BASE OF FRESH WATER: 0 - 200

CURRENT CASING PROGRAM: 7" cem. above zone; 5 1/2" liner landed through zone.

METHOD OF WASTE DISPOSAL: Evaporation and percolation sumps on outcrops of the Round Mountain Silt.

REMARKS: A cyclic steam injection project in the Pyramid Hill and Vedder zones was started in 1965 and terminated in 1968. Cumulative injection totals 12,200 bbls. The Pyramid Hill zone was originally known as the Elbe zone.

REFERENCES: Park, W.H. J.R. Weddle, J.A. Barnos, Main Coffee Canyon and Pyramid Areas of Round Mountain Oil Field: Calif. Div. of Oil and Cos, Summary of Operations--Calif. Oil Fields, Vol. 49, No. 2 (1963).

MATN ADEA

MA MODINIATIN OIL LIEPD

Karn Counts

LOCATION: See map sheet of Round Mountain Oil Field

TYPE OF TRAP: Faulted homocline

ELEVATION: 600 - 1,500

DISCOVERY DATA

					Initial daily production	
Zone	Present operator and well name	Original operator and well name	. Sec. T. & R.	B&M	Oll Gas. (bbl) (Mcf)	Date of completion
Jewett Pyramid Hill Vedder	Getty Oil Co. No. 2 Same as above Same as above	Elbe Cil Land Dev. Co. No. 2 Same as above Same as above	20 285 29E 20 285 29E 20 285 29E	MD ·	*204 N.A N.A. N.A N.A. N.A	May 1927
					YANG TANKA	

Remarks: * Production listed for Jewett is the combined production rate from the Jewett, Pyramid Hill, and Vedder zones.

DEEPEST WELL DATA

		Date		Depth	At total depth
Present operator and well name	Original operator and well name	started	Sec. T. & R.	B&M (feet)	Strata Age
Shell Oil Co. "Jewett" 3	Same	Jun 1928	29 28S 29E	MD 2,678	Walker Eo &/or Olig

PRODUCING ZONES

	Average	Average net thickness		Geologic	Oil gravity (°API) or	Salinity of zone water	Class BOPE
Zone	depth (feet)	(feet)	Age	Formation ·	Gas (btu)	gr/gal	required
Jewett Pyramid Hill Vedder	1,600 1,900 2,000	130 150 80	early Miocene early Miocene early Miocene	Freeman-Jewett Jewett Vedder	22 18 16	N.A. N.A. 95	None None None
				I		**************************************	
	-						

PRODUCTION DATA (Jan. 1, 1973)

	1972 Production		1972 Proved	1972 Average number	Cumulative	production	Peak oil prod	uction	Total numb	er of wells	Maximum proved
Oif (bbi)	Net gas (Mcf)	Water (bbl)	acreage	producing wells	Oij (bbi)	Gas (Mcf)	Barrels	Year	Drilled .	Completed	acreage
510,916	46,561	35,953,284	1,415	171	59,572,216	1,293,959	3,794,620	1938	302	225	1,465

STIMULATION DATA (Jan. 1, 1973)

Type of project	Date started	Cumulative injection - Water, bbl; Gas, Mcf; Steam, bbl (water equivalent)	Maximum number of wells used for injection
			•
."			

SPACING ACT: Does not apply

BASE OF FRESH WATER: None

CURRENT CASING PROGRAM: 7" cem. above zone; 5 1/2" liner landed through zone.

NETHOD OF WASTE DISPOSAL: 4,845,286 bbl. of waste water was injected during 1972 into two disposal wells; percolation and evaporation sumps on outcrops of the Round Mountain Silt.

REMARKS: A water flood project in the Vedder zone was started in 1961 and terminated in 1963. Cumulative injection totals 872,587 bbls.

REFERINCES: Park, W.H., J.R. Weddle, J.A. Barnes, Main. Coffee Canyon, and Pyromid Areas of Round Mountain Oil Field: Calif. Div. of Oil and Gas Summary of Operations- Calif. Gil Fields, Vol. 45, No. 2 (1963).

PYRAMID AREA

ROUND MOUNTAIN OIL FIELD

Kern County

LOCATION: See map sheet of Round Mountain Oil Field

TYPE OF TRAP: Faulted homocline

ELEVATION: 730 - 1,470.

DISCOVERY DATA

					011	dally ection Gas	Date of
Zone	Present operator and well name	Original operator and well name	Sec. T. & R.		(bbi)	(Mcf)	completion
Pyramid Hill Vedder	Thomas Oil Co. "Olcese" 2 Crestmont Oil Co. "Olcese" 1	Harp & Brown "Olcese" 2 Eastmont Oil Co. "Olcese" 1		MD	250	N.A.	May 1944 May 1937
Walker	Crestmont Oil Co. "Staley" 11	Same as present	8 285 29E	MD	40	N.A.	Jul 1943
artij ji di bi							
		·					

Remarks:

DEEPEST WELL DATA

Present operator and well name	Original operator and well name	Date started	Sec. T. & R.	8.& M	Depth (feet)	At total d	epth Age
Piùte Holding Co. "Smith" 1	Same	Oct 1929		MD	3,110	Walker	Eo &/or Olig

PRODUCING ZONES

T KODOGHTO DOTTED					and the second second second		and the second s
	Average depth	Average net thickness		Geologic	Oll gravity (°API) or	Salinity of zone water	Class BOPE
Zone	(feet)	(feet)	Age	Formation.	· Gas (btu).	gr/gal.	required
Pyramid Hill	1,250.	130	early Miccene	Jewett	18 .	50	None
Vedder	1,390	40	early Miocene	Vedder	16	80 - 110	None
Walker	1,535	50	Eo 6/or Olig	Walker	2,0	N.A.	None
						1	
						1	
						1	
	·					}.	•
	1		I		1 1	1	•

PRODUCTION DATA (Jan. 1, 1973)

- 2:		1711 (June 1, 177)		- d	er and the second		1 A	X				
1	6 32 . 2 po h	1972 Production		1972 Proved	1972 Average number	Cumulative	production	Peak oll prod	uction	Total num	ber of wells	Maximum proved
-5	Oll.(bbl)	Net gas (Mcf)	Water (bbl)	acreage	producing wells	Oll (bbl)	Gas (Mcf)	Barrels	Year	Drilled	Completed	acreage
9.50	55,714	74	1,527,767	290	37	5,692,349	6,876	378,882	1946	98	. 60	300

STIMULATION DATA (Jan. 1, 1973)

Type of project	Date started .	Cumulative injection - Water, bbl; Gas, Mcf; Steam, bbl (water equivalent)	Maximum number of wells used for injection
1 - y -			
	i : -		

SPACING ACT: Applies

BASE OF FRESH WATER: None

CURRENT CASING PROGRAM: 8 5/8" or 7" cem. above zone; 6 5/8" or 5" liner landed through zone.

METHOD OF WASTE DISPOSAL: Evaporation and percolation sumps on outcrops of the Round Mountain Silt.

REMARKS:

REPERENCES, Park, W.M., J.R. Woddle, J.A. Farnes, Main, Coffee Conyon, and Tyromid Areas of Reund Mountain Oll Field: Calif. Div. of Oll and Cas, Summary of Operations--Calif. Oil Fields, Vol. 49, No. 2 (1963).

SHARKTOOTH AREA

LOCATION: See map sheet of Round Mountain Oil Field

TYPE OF TRAP: Faulted homocline

ELEVATION: 700 - 1,300

DISCOVERY DATA

DISCOVERT DATA			, ·		Initial daily production			
Zone	Present operator and well name	Original operator and well-name	Sec. T. & R.			Gas (Mcf)	Date of completion	
Vedder	G M V Oil Co. "Signal-Mills" 1	Bandini Petroleum Co. "Signal Mills" 1	24 28S 28E	MD	214	N.A.	Sep 1943	
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						4.		
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DEEPEST WELL DATA

DELL MAY REAL STATE		Date			Depth	At total d	epth.
Present operator and well name	Original operator and well name	started	Sec. T. & R.	8 & M		Strata	Age
Mobil Oil Corp. "Bradford" 1	General Petroleum Corp. "Bradford" 1	Jun 1943	15 28S 28E	MD	2,995	Vedder	early Mio

PRODUCING ZONES	Average depth	Average net thickness	G	eologic	Oll gravity (*API) or	Salinity of zone water	Class BOPE
Zone	(feet)	(feet)	Age	Formation	Gas (btu)	gr/gal	required
Vedder	2,400	25	early Miocene	Vedder	13	'N.A.	None
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•	PRODUCTION DA	ATA (Jan. 1, 197	3) ' '								5 1 1 1 1 - 1 1 - 1 1 1 1 1 1 1 1 1 1 1
		1972 Production		1972	1972	Cumulative	production	Peak oil prod	uction	Total number of wells	Maximum *
	(14d) 110	Net gas (Mcf)	Water (bbi)	Proved acreage	Average number producing wells	O[1 (bb1)	- Gas (Mcf)	Barrels ·	Year	Drilled Complete	
	35,360	D D	3.749.291	245	. 31	4,828,613	55,811	503,449	1947	85 58	3. 270 .
	33,500		-,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,	i.	1						1 (1)

STIMULATION DATA (Jan. 1, 1973)

	Type of project	Date started	Cumulative injection - Water, bbl; Gas, Mcf; Steam, bbl (water equivalent)	Maximum number of wells used for injection
·				
	. :-			* m - 1

SPACING ACT: Applies

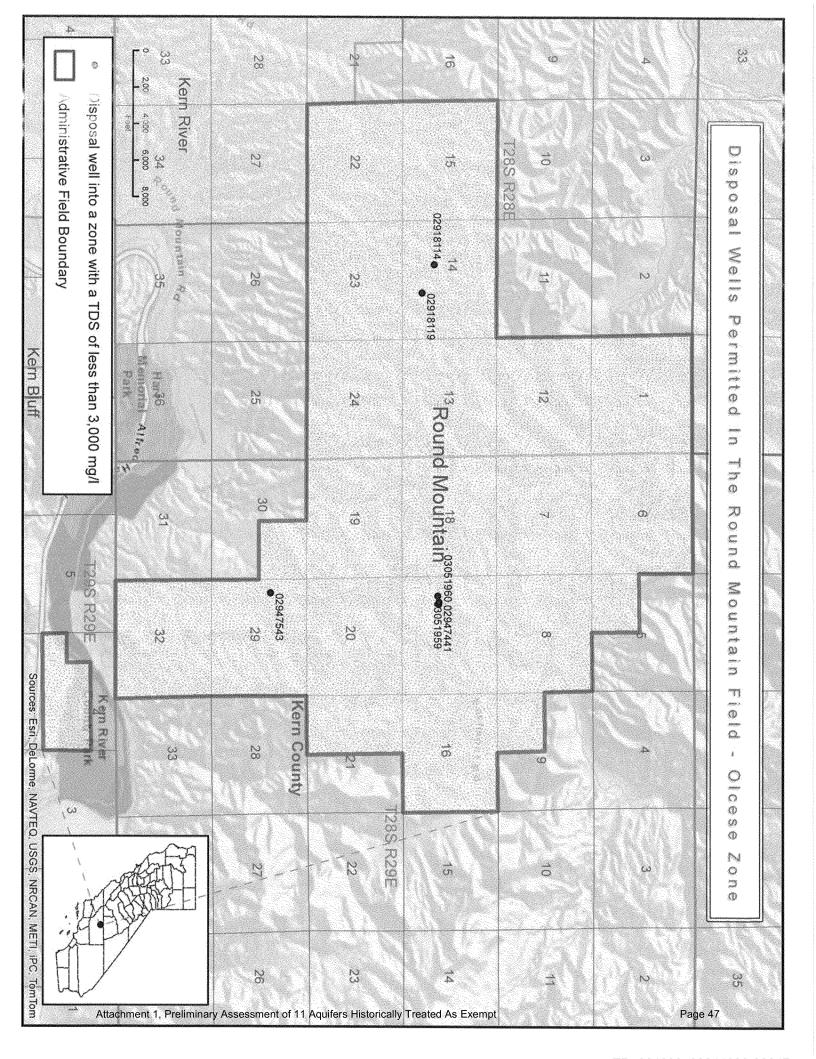
BASE OF FRESH WATER: None

CURRENT CASING PROGRAM: 8 5/8" cem. above zone; 6 5/8" liner landed through zone.

METHOD OF WASTE DISPOSAL: Evaporation and percolation sumps on outcrops of the Round Mountain Silt.

REMARKS:

REFERENCES: Albright, M.B. Jr., Sharktooth and Alma Areas of Round Mountain Gil Field: Calif. Div. of Gil and Gas. Summary of Operations--Calif. Gil Fields, Vol. 42, No. 1 (1956).



Round Mountain Field, Walker Zone, East Side Bakersfield District

1) Number of disposal wells permitted in the zone:

30 (4 of these are permitted in both the Olcese and Walker Zones in Round Mountain Field). There are 2 gas disposal wells.

2) Number of active producers:

4 wells (Note that although this aquifer was historically treated as exempt as a non-hydrocarbon producing formation, the Walker zone within the field has current production.)

3) Depth of the zone where the disposal wells are located:

1,890' to 2,590' below surface

4) Volumes injected historically since 1983:

1,529,910,014 Bbls, last injected on 3/1/2015

5) TDS of zone:

2,335 mg/l TDS

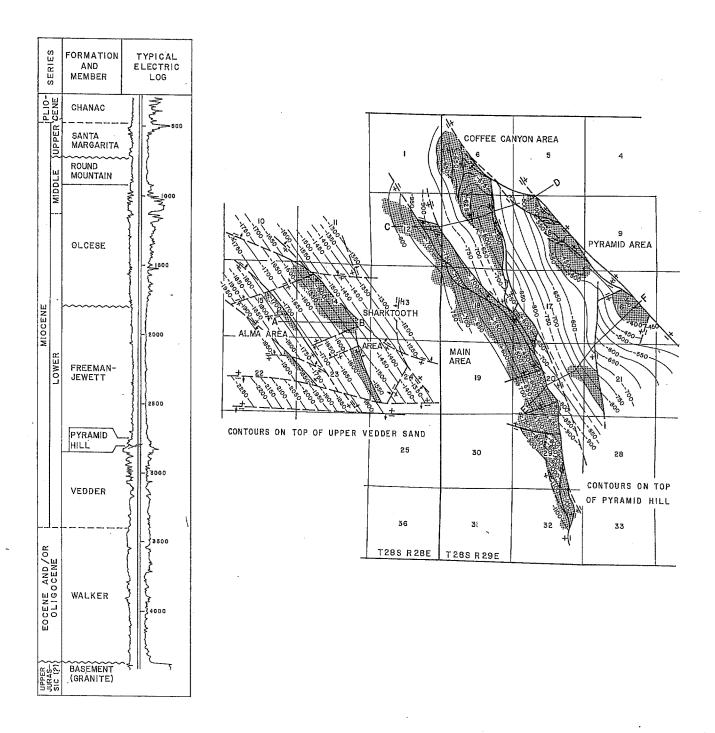
Sample 2,335 mg/l TDS is from "Walker zone formation water" (Round Mountain WD 1-20) on 10/17/1983.

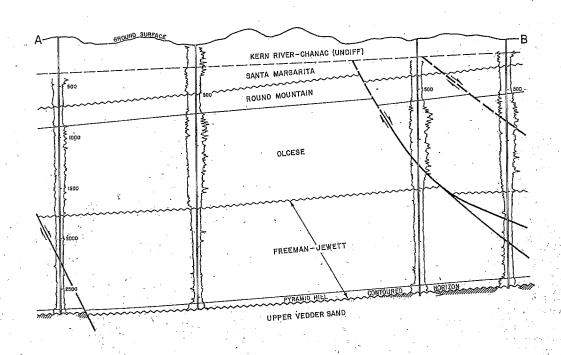
6) TDS of injection water:

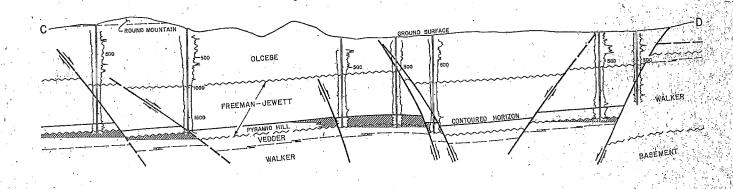
1,600 - 2,900 mg/l TDS

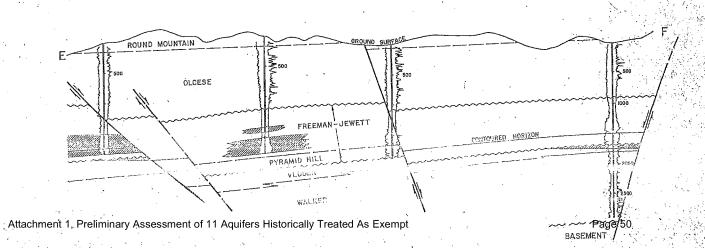
The 1,600 mg/l TDS sample is from "NAM Produced water (West signal #8) on 1/1/2009 and the 2,900 mg/l TDS sample is from "18 -WD7" on 9/20/2012. Permitted fluids for injection into the Walker Zone in Round Mountain field consist of Pyramid Hill, Jewett, Freeman-Jewett and Vedder zones production fluid.

ROUND MOUNTAIN OIL FIELD

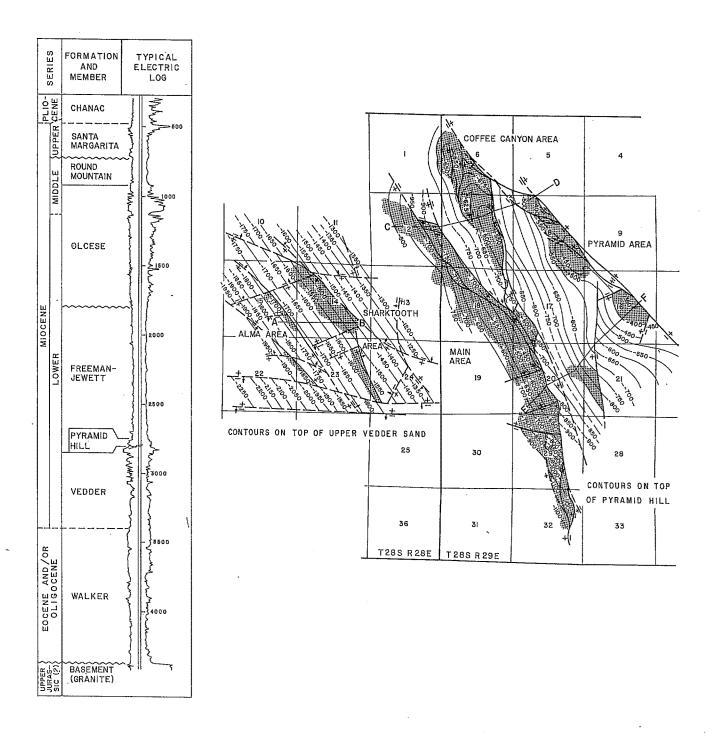








ROUND MOUNTAIN OIL FIELD



Kern County

LOCATION: 14 miles northeast of Bakersfield

TYPE OF TRAP: See areas

ELEVATION: 600 - 1,500

DISCOVERY DATA

Zone	Present operator and well name	Original operator and well name	Sec. T. & R.	B & M	Initial dali production OII Ga (bbl) (Mo	Date of
Jewett Pyramid Hill	Getty 0il Co. No. 2 Same as above Same as above	Elbe Oil Land Dev. Co. No. 2 Same as above Same as above	20 28S 29E 20 28S 29E 20 28S 29E	MD MD	*204 N./ N.A. N./ N.A. N./	May 1927

Remarks: * Production listed for Jewett is the combined production rate from the Jewett, Pyramid Hill, and Vedder zones.

DEEPEST WELL DATA

		. Date			Depth	. At total c	lepth
Present operator and well name	Original operator and well name	started	Sec. T. & R.	8 & M	(feet)	Strata	Age
C.C. Killingsworth "Alma" 6	Barnsdall Oil Co. "Alma" 6	Mar 1948	15 28S 28E	MĎ	4,418	Basement (Granite)	Late Jur (?)

PRODUCING ZONES	(See areas) Average depth	Average net thickness	Ge	ologic	Oil gravity (°API) or	Salinity of	Class BOPE
Zoné	(feet)	. (feet)	, Age	Formation	Gas (btu)	zone water gr/gal	required
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		_					
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PRODUCTION DATA (Jan. 1, 1973)

	1972 Production		1972 Proved	1972 Average number	Cumulative	production	Peak oil prod	uction		ber of wells	Maximum proved
Oll (bbl)	Net gas (Mcf)	Water (bbl)	acreage	producing wells	Oil (bbt)	Gas (Mcf)	Barrels	Year	Drilled	Completed	acreage
711,406	46,635	48,630,496	2,435	. 292	89,199,121	1,424,213	5,453,194	1938	665	468	2,590

STIMULATION DATA (Jan. 1, 1973) (See areas)

		(000)	
Type of project	Date , started	Cumulative Injection - Water, bbl; Gas, Mcf; Steam, bbl (water equivalent)	Maximum number of wells used for injection
-			
747			

SPACING ACT: See areas.

BASE OF FRESH WATER: See areas.

CURRENT CASING PROGRAM: See areas.

METHOD OF WASTE DISPOSAL: See areas.

REMARKS:

REFERENCES: See areas.

LOCATION: See map sheet of Round Mountain Oil Field

ALMA AREA

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TYPE OF TRAP: Faulted homocline

ELEVATION: 700 - 1,270

DISCOVERY DATA

		100		· production	Date of
Zone	Present operator and well name	Original operator and well name	Sec. T. & R. B &	M (bbt) (Mcf)	completion
Vedder	Harold C. Morton & H.S. Kohlbush "Alma" 1	Same as present	15 28S 28E MD	152 N.A.	Feb 1947
					1,44 1,74
			,		

Remarks:

DEEPEST WELL DATA	 · · · · · · · · · · · · · · · · · · ·	 				_ At total d	ohth
		 Date	1	- 1	Depth	At total u	chin with post about
Present operator and well name	 Original operator and well name	started	Sec. T. & R.	8 & M	(feet)	Strata	Age.
	 	 Mar 1948	15 28S 28E	MD	4.418	Basement	Late Jur
C.C. Killingsworth "Alma" 6	 Barnsdall Oil Co. "Alma" 6	 Mar 1340	13 200 202	r.i.o	7,7120	(Granite)	Leb. 544 77
		,	. ,	,	•		

PRODUCING ZONES	Average	Average net thickness	, G	eologic	Oll gravity («API) or	Salinity of zone water	Class BOPE
Zone	depth (feet)	(feet)	Age	Formation	Gas (btú)	gr/gai	required
Vedder	2,600	'15	early Miocene	Vedder	13	N.A.	None
6	-						
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v v							
•						1.	

PRODUCTION DA	ATA (Jan. 1, 1973))				* *******	1000 1 11 11 11		7 2507	7 - 23 76- 1	Maximum
1.79	1972 Production		1972	1972	. Gumulative	production	Peak oil prod	uction	Total number	r of wells	Maximum proved
		1.3	Proved	Average number	Oil (bbl)	Gas (Mcf)	Barrels	Year	Driffed	Completed	acreage .
(ldd) (iO:	Net gas (Mcf)	Water (bbi)	acreage	producing wells		Gas (MC1)	113,392	1948	47	21	80
6.240	0	107,447	. 50	3	598,904	l u	113,392	1946	""/	47	(C () () ()
		3			1	1	i		1		A 20 10 10 10 10 10 10 10 10 10 10 10 10 10

STIMULATION DATA (Jane 1, 1973)

Type of project	Date started	Cumulative injection - Water, bbl; Gas, Mcf; Steam, bbl (water equivalent)	Maximum number of wells used for injection

SPACING ACT: Applies

BASE OF FRESH WATER: None

CURRENT CASING PROGRAM: 8 5/8" cem. above zone; 6 5/8" liner landed through zone.

METHOD OF WASTE DISPOSAL: Evaporation and percolation sumps on outcrops of the Round Mountain Silt.

REMARKS:

REFERENCES: Albright, M.B. Jr., Sharktooth and Alam Areas of Kound Mountain Oil Field: Calif. Div. of Oil and Gas, Summery of Operations--Calif. Oil Fields, Vol. 42, No. 1 (1956).

COFFEE CANYON AREA

ROUND MOUNTAIN OIL FIELD

Kern County

LOCATION: See map sheet of Round Mountain Oil Field

TYPE OF TRAP: Faulted homocline

ELEVATION: 690 - 1,300

DISCOVERY DATA

Zone Pyramid Hill	Present operator and well name	Original operator and well name	Sec. T. & R.	 	Date of
	Acacia Oil Co. "Coffee" 1 Acacia Oil Co. "Lindsay" 1	Reynolds Oil and Gas Co. No. 1 Lindsay Oil Co. No. 1	6 285 29E 6 28S 29E	*600 N.A 800 N.A	
•					

Remarks: * Production is commingled from Pyramid Hill and Vedder.

DEEPEST WELL DATA

Present operator and well name	Original operator and well name	Date started	Sec. T. & R.	8 & M	Depth	At total d	eptii Age
Richard S. Rheem, Opr. "Smoot-Vedder" 2	Same	May 1957	1 28S 28E				early Mio

PRODUCING ZONES

	Average - depth	Average net thickness	. G	eologic	Oil gravity (API) or	Salinity of	Class BOPE required	
Zone Pyramid Hill Vedder	(feet)	(feet)	Age	Formation	Gas (btu)	zone water gr/gal		
	1,500 1,650	150 30	early Miocene early Miocene	Jewett Vedder	18 16	50 75	None None	
•			-					

PRODUCTION DATA (Jan. 1, 1973)

	1972 Production		1972 Proved	1972 Average number	Cumulative	production	. Peak oil prod		Total num	ber of wells	Maximum proved
O11 (b51)	Net gas (Mcf)	Water (bbl)	acreage	producing wells	Oil (bbl)	Gas (Mcf)	Barrels	Year	Drilled	Completed	acreage
103,176	0	7,292,707	435	50	18,507,039	67,567	1,857,108	1937	133	104	475
The Art All Control											

STIMULATION DATA (Jan. 1, 1973)

Type of project	Date started	Cumulative injection - Water, bbl; Gas, Mcf; Steam, bbl (water equivalent)	Maximum number of wells used for injection
Water flood	1960	3,815,746	1
		-	

SPACING ACT: Does not apply

BASE OF FRESH WATER: 0 - 200

CURRENT CASING PROGRAM: 7" cem. above zone; 5 1/2" liner landed through zone.

METHOD OF WASTE DISPOSAL: Evaporation and percolation sumps on outcrops of the Round Mountain Silt.

REMARKS: A cyclic steam injection project in the Pyramid Hill and Vedder zones was started in 1965 and terminated in 1968. Cumulative injection totals, 12,200 bbls. The Pyramid Hill zone was originally known as the Elbe zone.

REFERENCES: Park, W.H. J.R. Weddle, J.A. Barees, Mein, Coffee Conyon, and Dyracil Areas of Round Mountain Oil Field: Calif. Div. of Cil and Cas, Summary of Operations--Calif. Oil Fields, Vol. 49, No. 2 (1963).

ROUND MOUNTAIN OIL FIELD

MAIN AREA

Kern County

LOCATION: See map sheet of Round Mountain 011 Field

TYPE OF TRAP: Faulted homocline

ELEVATION: 600 - 1,500

DISCOVERY DATA

	-		•		Initial dall production	
Zone	Present operator and well name	Original operator and well name	Sec. T. & R.			
Jewett Pyramid Hill Vedder	Getty Oil Co. No. 2 Same as above Same as above	Elbe 0il Land Dev. Co. No. 2 Same as above Same as above	20 285 29E 20 285 29E 20 285 29E	MD	N.A. N.	A. May 1927 A. May 1927 A. May 1927

Remarks: * Production listed for Jewett is the combined production rate from the Jewett, Pyramid Hill, and Vedder zones.

DEEPEST WELL DATA

			Date		-	Depth	At total	depth
Present operator and well name		Original operator and well name	started	Sec. T. & R.	B&M		Strata	Ağe 7.4
Shell Oil Co. "Jewett" 3	Same		 Jun 1928	29 28S 29E	MD	2,678	Walker	Eo 5/or Olig

PRODUCING ZONES

	Average depth	Average net thickness	. G	ieologic	Oil gravity (°API) or	Salinity of zone water	Class BOPE	t,
Zone	(feet)	(feet)	Age	Formation:	Gas (btu)	gr/gal	required	
Jewett Pyramid Hill Vedder	1,600 1,900 2,000	130 150 80	early Miocene early Miocene early Miocene	Freeman-Jewett Jewett Vedder	22 18 16	N.A. N.A. 95	None None None	
							•	
	1							٠

PRODUCTION DATA (Jan. 1, 1973)

	I KODUCTION D.	cease (june 4, by),	"									
		1972 Production		1972 Proved	1972 Average number	Cumulative	production	Peak oil prod	uction		er of wells	Maximum proved
	OII (bbi)	Net gas (Mcf)	Water (bbl)	acreage	producing wells	Oij (bbl)	Gas (Mcf)	Barrels	Year	Drilled .	Completed	acreage
Ċ	510,916	.46,561	35,953,284	1,415	. 171	59,572,216	1,293,959	3,794,620	1938	302	225	1 (465.
		ì		ł	I			I	1	1 1		

STIMULATION DATA (Jan. 1, 1973)

Type of project	Date started	Cumulative injection - Water, bbi; Gas, Mcf; Steam, bbi (water equivalent)	Maximum number of wells used for injection
			• •

SPACING ACT: Does not apply

BASE OF FRESH WATER: None

CURRENT CASING PROGRAM: 7" cem. above zone; 5 1/2" liner landed through zone.

METHOD OF WASTE DISPOSAL: 4,845,286 bbl. of waste water was injected during 1972 into two disposal wells; percolation and evaporation sumps on outcrops of the Round Mountain Silt.

REMARKS: A water flood project in the Vedder zone was started in 1961 and terminated in 1963. Cumulative injection totals 872,587 bbls.

REFERENCES: Park, W.H., J.R. Weddle, J.A. Barnes, Hain. Coffee Canyon, and Pyromid Areas of Round Mountain Oil Field: Calif. Div. of Oil and Gas, Summary of Operations -- Calif. Oil Fields, Vol. 49, No. 2 (1963).

PYRAMID AREA

ROUND MOUNTAIN OIL FIELD

Kern County

LOCATION: See map sheet of Round Mountain Oil Field

TYPE OF TRAP: Faulted homocline

ELEVATION: 730 - 1,470

DISCOVERY DATA

	3					l dally iction	**
Zone	Present operator and well name	Original operator and well name	Sec. T. & R.	B & M	Oil (bbl)	Gas (Mcf)	Date of completion
Pyramid Hill Vadder	Thomas Oil Co. "Olcese" 2 Crestmont Oil Co. "Olcese" 1	Harp & Brown "Olcese" 2 Eastmont Oil Co. "Olcese" 1	17 28S 29E 16 28S 29E		5 250	0	May 1944 May 1937
Vedder Walker	Crestmont Oil Co. "Staley" 11	Same as present	8 28S 29E		40	N.A. N.A.	Jul 1943
			-				
	• * * * * * * * * * * * * * * * * * * *			,			

Remarks:

DEEPEST WELL DATA

Present operator and well name	Original operator and well name	Date started	Sec. T. & R.	8.& M	Depth (feet)	At total d	epth Age
Piùte Holding Co. "Smith" 1	Same	Oct 1929	17 28S 29E	MD	3,110	Walker	Eo &/or Olig

PRODUCING ZONES

	Average	Average net thickness		Reologic	Oil gravity	Salinity of	Class BOPE
Zone	depth (feet)	(feet)	Age	Formation	(°ÁPI) or Gas (btu)	zone water gr/gal	required
Pyramid Hill Vedder Walker	1,250. 1,390 1,535	130 40 50	early Miocene early Miocene Eo &/or Olig	Jewett Vedder Walker	18 . 16 20	50 80 - 110 N.A.	None None None
5)							

PRODUCTION DATA (Jan. 1, 1973)

	toog GI ton b.	1411 (July 17, 171)	· · · · ·		at the second second	·		· 1 &				<u> </u>	
100	5 Sec. 32 10 10	1972 Production		1972 Proved	1972 Average number	Cumulative	production	Peak oil prod	uction	Total num	ber of wells	Maximum proved	
<u> </u>	Ö11.(bb1)	Net gas (Mcf)	Water (bbl)	acreage	producing wells	Oli (bþi)	Gas (Mcf)	Barrels	Year	Drilled	Completed	acreage	
÷ .	55,714	74	1,527,767	290	37	5,692,349	6,876	378,882	1946	98	. 60	300	•

STIMULATION DATA (Jan. 1, 1973)

Type of project	Date started	Cumulative injection - Water, bbi; Gas, Mcf; Steam, bbi (water equivalent)	Maximum number of wells used for injection
	-		

SPACING ACT: Applies

BASE OF FRESH WATER: None

CURRENT CASING PROGRAM: 8 5/8" or 7" cem, above zone; 6 5/8" or 5" liner landed through zone.

METHOD OF WASTE DISPOSAL: Evaporation and percolation sumps on outcrops of the Round Mountain Silt.

REMARKS:

REFERENCES: Park, W.M., J.R. Weddle, J.A. Barnes, Main, Coffic Canyon, and Tyromid Areas of Round Mountain 011 Field: Calif. Div. of Cil and Cas, Summary of Operations--Calif. 011 Fields, Vol. 49, No. 2 (1963).

LOCATION: See map sheet of Round Mountain Oil Field

TYPE OF TRAP: Faulted homocline

ELEVATION: 700 - 1,300

DISCOVERY DATA

SHARKTOOTH AREA

DISCOVERT DATA		1				i daily action.	
Zone	Present operator and well name	Original operator and well-name	Sec. T. & R.	B & M	Oil (bbl)		Date of completion
	G M V Oil Co. "Signal-Mills" 1	Bandini Petroleum Co. "Signal Mills" 1	24 28S 28E	1	214	N.A.	Sep 1943
						1	
•			:				
	·	·					
			١.	•			2

Remark's:

DEEPEST WELL DATA

	Present operator and well name	Original operator and well name	Date started	Sec. T. & R.	8 & M	Depth (feet)	At total depth	e ·
í.	Mobil Oil Corp. "Bradford" 1	General Petroleum Corp. "Bradford" 1	Jun 1943	15 28S 28E	MD	2,995	Vedder early	Mio

PRODUCING ZONES	Average Average no depth thickness			Geologic	Oil gravity (°API) or	Salinity of zone water	Class BOPE		
Zone	(feet)	(feet)	Age	Formation	Gas (btu)	gr/gal	required		
Vedder	2,400	25	early Miocene	Vedder	13	N.A.	None		
							• • • • •		
		,							
							÷ -		
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	1			' '			•		
		-					- :		
				7			· · ·		
	1			1	١.				

	Litopoction by	terre (Jense et evis	.,					,			2. 2. 2.	· Maximum : a
	1972 Production			1972	1972	Cumulative	production	Peak oil prod	ection	Total numb	er of wells	proved
	OH (bbl)	Net gas (Mcf)	Water (bbl)	Proved acreage	Average number producing wells	Oll (bbl)	- Gas (Mct)	Barrels	Year	Dilled	- Completed	acreage :: '
	35,360	וופנ שמט נווינוו	3,749,291	245	31	4,828,613	55,811	503,449	1947	85	58	270
٠	33,300	·	3,743,232							1 1		2412

STIMULATION DATA (Jan. 1, 1973)

	Type of project		Date started	Cumulative injection - Water, bbl; Gas, Mcf; Steam, bbl (water equivalent)	Maximum number of wells used for injection
· .	,	· ·	- ""		
•	, † -				

SPACING ACT: Applies

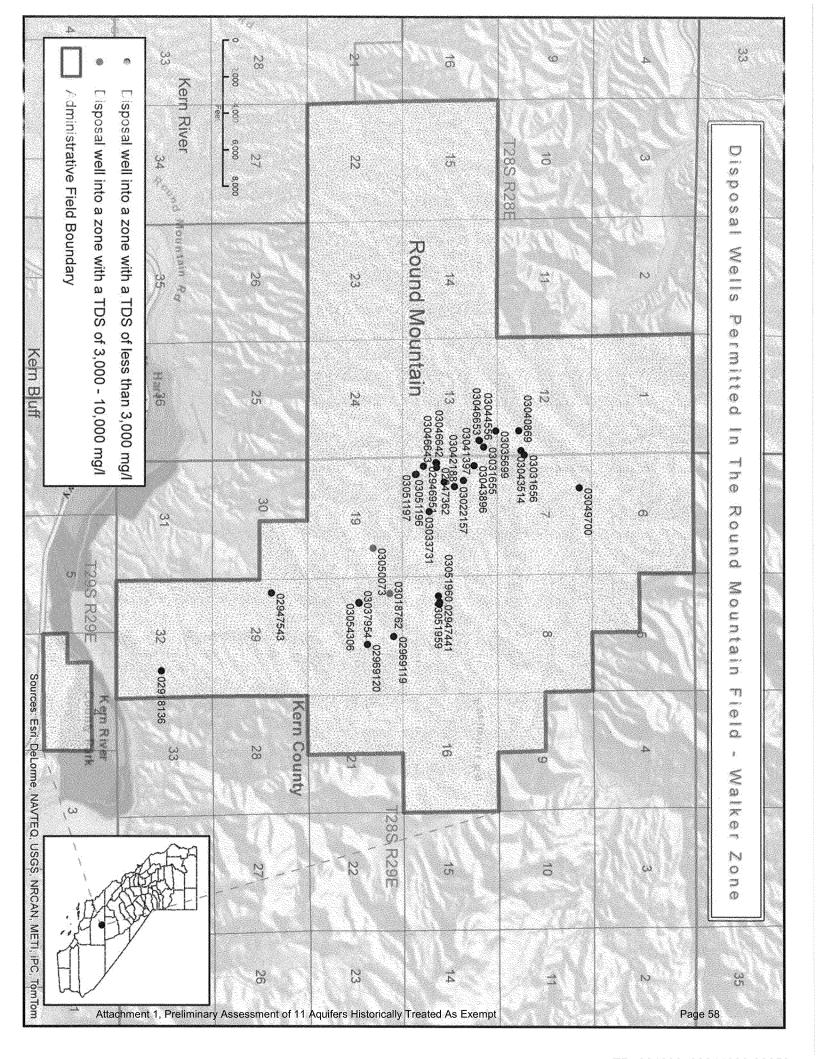
BASE OF FRESH WATER: None

CURRENT CASING PROGRAM: 8 5/8" cem. above zone; 6 5/8" liner landed through zone.

METHOD OF WASTE DISPOSAL: Evaporation and percolation sumps on outcrops of the Round Mountain Silt.

REMARKS:

REFERENCES: Albright, M.B. Jr., Sharktooth and Alma Areas of Round Mountain Oil Field: Calif. Div. of Oil and Gas. Summary of Operations--Calif. Fields, Vol. 42, No. 1 (1956).



Bunker Gas Field, Undiff. (Post Eocene) Zone, Sacramento District Office

1) Number of disposal wells permitted in the zone:

2) Number of active producers:

0

3) Depth of the zone across the field:

3,000' below surface

4) Volumes injected historically since 1983:

51,454 Bbls, last injected on 11/1/1985. WD well API #095-00016 was P&A on 12/9/1986.

5) TDS of zone:

1,215 mg/I TDS

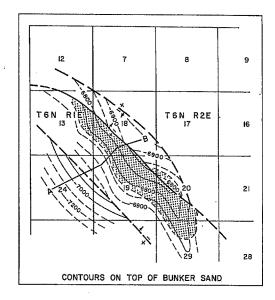
Sample collected from "BGZU" 601 well on January 16, 1974.

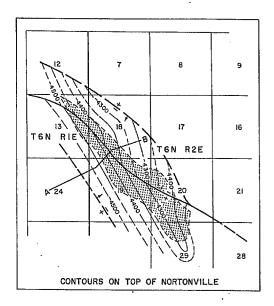
6) TDS of injection water:

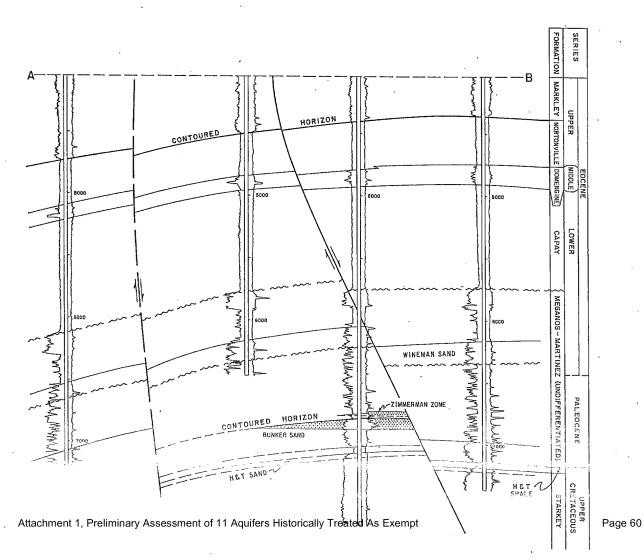
10,675 - 11,025 ppm Chloride

Sample collected from "Bunker B-2 Zone" on April 26, 1973.

BUNKER GAS FIELD







LOCATION: 22 miles southwest of Sacramento

TYPE OF TRAP: Faulted anticline

ELEVATION: 25 DISCOVERY DATA

	•				Initial production			
Zone	Present operator and well name	Original operator and well name	Sec. T. & R.	B& M	Dally (Mcf)	Flow pressure (psl)	Bean size (in.)	Date of completion
Zimmerman	Amerada Hess Corp., Unit Oper. "BGZU" 901	Amerada Petroleum Corp., Oper. "Zimmerman"	29 6N 2E	MD	3,890	2,250	9/32	Aug- 1961
Bunker	Amerada Hess Corp., Unit Oper. "BGZU" 701	G.E. Kadane & Sons "Main Prairie Gas Unit A" 1	20 6N 2E	MD	3,425	2,250	1/4	Jun 1960
	·							

Remarks:

DEEPEST WELL DATA

-					Depth	At total depth	
Present operator and well name	Original operator and well name	started	Sec. T. & R.			Strata	. Age
Amerada Hess Corp., Unit Oper. "BGZU" 702	G.E. Kadane & Sons "Maine Prairie Gas Unit A"	Jan 1962	19 6N 2E	MD	10,098	Winters	Lt Cret

PRODUCING ZONES

	Average depth	Average net thickness				Salinity of zone water	Original zone	Class BOPE
Zone	(feet)	(feet)	Age _	Formation	Gas (btu)	gr/gal	pressure (psi)	required
Zimmerman Bunker	6,780 6,845	15 25 ,	Paleocene Paleocene	Martinez Martinez	1,075 1,075	4 2	. 2,930 2,975	IV IV
-								
•								

PRODUCTION DATA (Jan. 1, 1973)

-	1972 Production		1972 Proved	1972 Maximum number	Cumulative gas	Peak gas prod	luction	Total num	ber of wells	Maximum proved	
	Net gas (Mcf)	Water (bbl)	acreage	producing wells		production (Mcf)	(Mcf)	Year	Drilled	Completed	acreage
	3,073,729	6,704	810	8	53,141,694	10,457,830	1963	22	10	850	

SPACING ACT: Applies

BASE OF FRESH WATER: 2,500 - 3,100

CURRENT CASING PROGRAM: 9 5/8" or 7" cem. 600; 4 1/2" cem. through zones and across base of fresh-water sands.

METHOD OF WASTE DISPOSAL: Disposal into sumps at well sites.

REMARKS: Commercial gas deliveries began in October 1961. 1972 condensate production 11,256 bbl.; cumulative condensate production 233,716 bbl.

REFERENCES: Hunter, W.J., Bunker Gas Field: Calif. Div. of Oil and Gas, Summary of Operations -- Calif. Oil Fields, Vol. 47, No. 1 (1961).

Wild Goose Field, Undiff. Zone, Sacramento District Office

Number of disposal wells permitted in the zone:
 0 (only contains gas storage wells in this zone)

2) Number of active producers:

0

3) Depth of the zone across the field:

2,700' - 3,400' below surface.

4) Volumes injected historically since 1983:

None, only contains gas storage wells

5) TDS of zone:

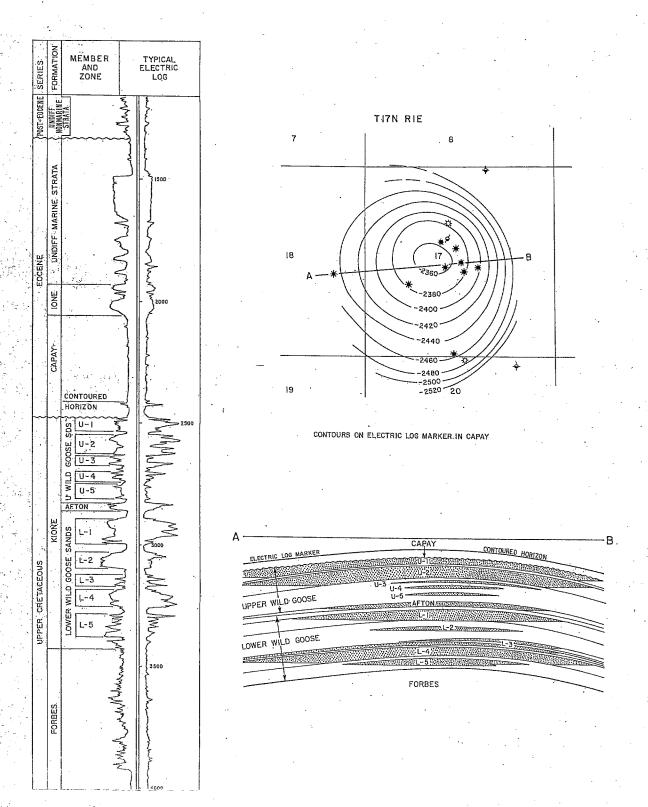
24,349 mg/I TDS

Geochemical Analysis of Kione L4 sample provided in UIC Project File.

6) TDS of injection water:

24,349 mg/I TDS

Geochemical Analysis of Kione L4 sample provided in UIC Project File.



Attachment 1, Preliminary Assessment of 11 Aquifers Historically Treated As Exempt

WILD GOOSE GAS FIELD

Butte and Colusa Counties

LOCATION: 10 miles northwest of Colusa

TYPE OF TRAP: Dome

ELEVATION: 65

DISCOVERY DATA					Init	al producti	Ort	100
7	Present operator and well name	Original operator and well name	Sec. T. & R.	B & M	Daily (Mcf)	Flow pressure (psi)	Bean size (in.)	Date of completion
Upper Wild Goose	Exxon Corp. "Wild Goose Gas Unit 1" 6 Exxon Corp. "Wild Goose Gas Unit 1" 4 Exxon Corp. "Wild Goose Gas Unit 1" 6 Exxon Corp. "Wild Goose Gas Unit 1" 6 Exxon Corp. "Wild Goose Gas Unit 1" 1	Humble Oil & Rfg. Co. "Wild Goose" 6 Honolulu Oil Corp. "Honolulu-Humble Wild Goose" 4 Humble Oil & Rfg. Co. "Wild Goose" 6 Honolulu Oil Corp. "Honolulu-Humble Wild Goose" 1	17 17N 1E 17 17N 1E 17 17N 1E 17 17N 1E 17 17N 1E	MD MD MD MD	4,000 7,340 *4,840 4,020	940 880 1,040 1,370	24/64 36/64 24/64 24/64	Sep 1963 Jul 1953 Sep 1963 Aug 1951
*								- 30

Remarks: * Commingled production from Afton and Upper Wild Goose. HonoIulu Oil Corp. tested this zone in open hole at a maximum rate of 2,980 Mcf per day in "HonoIulu-Humble Tule Goose" 1 (now Exxon Corp. "Wild Goose Gas Unit 1" 7) during July 1952.

DEEPEST WELL DATA	•				·	20 Contract (10 Co
DEEPEST WELL DATA	T					At total depth
		Date			Depth.	THE RESERVE OF THE PROPERTY OF THE PARTY OF
Present operator and well name	Original operator and well name	started	Sec. T. & R.	B & M	(feet)	Strata Age
	Humble Oil & Rfg. Co. "Wild Goose Country	Aug 1967	18 17N 1E	MD	7,004	Dobbins Late Cret
Exxon Corp. "Wild Goose Gas Unit 1" 11	Humble Oil & Rfg. Co. "Wild Goose Country Club" 7	1.25				l filia i julia i juli

PRODUCING ZONES Salinity of zone water gr/gal Average depth (feet) Average net thickness (feet) Geologic Class BOPE Original zone pressure (psi) required Gas (btu) Formation Age Zone N.A. 1,780 -3,250 N.A. 1,800 -2,650 IV IV N.A. 800 1,105 Hangtown (Sub Capay) Upper Wild Goose Kione 2,400 -10 Lt Cretaceous 1,200 -1,310 1,335 1,345 -200 Lt Cretaceous Kione IV N.A. Afton Lower Wild Goose 2,850 2,900 Lt Cretaceous Kione 805 250 Lt Cretaceous 1,500

PRODUCTION DAT	TA (Jan. 1, 1973))							Havlavia
1972 Production		1972			Peak gas production		Total num	Maximum proved	
Net gas (Mcf)	Water (bb1)	Proved acreage	Maximum number producing wells	production (Mcf)	(Mcf)	Year	*Drilled .	Completed	acreage
1,382,761	0	340	9	99,229,200	8,248,811	1961	16	11	360

SPACING ACT: Applies

BASE OF FRESH WATER: 1,050

CURRENT CASING PROGRAM: 9 5/8" cem. 500; 5 1/2" cem. through zones and across base of fresh-water sands.

METHOD OF WASTE DISPOSAL: Water is injected into Exxon Corp. disposal well.

REMARKS: Commercial gas deliveries began in November 1951.

REFERENCES: Hunter, G.W., Wild Goose Gas Field: Calif. Div. of Oil and Gas, Summary of Operations -- Calif. Oil Fields, Vol. 41, No. 1 (1955)